IMPERIAL BUREAU OF ANIMAL HEALTH

THE

# VETERINARY BULLETIN

Vol. 6.] May, 1936. [No. 5.

## DISEASES CAUSED BY BACTERIA AND FUNGI.

MONKOWSKI, J. (1935). L'histogenèse de la pneumonie expérimentale produite par des staphylocoques chez les oiseaux et la problème de l'épithélium pulmonaire dans ce groupe des vertébrés. [**The Histology of Experimental Staphylococcal Pneumonia in Birds and the Problem of Pulmonary Epithelium in these Vertebrates**].—*C. R. Soc. Biol. Paris.* **120.** 481-483. [1 ref.]

The author has examined the reaction of the pulmonary tissues of fowls to intratracheal inoculation of staphylococci. From the response obtained he has concluded that, in birds, no epithelium exists in the lungs except in the bronchioles and vestibules and that the respiratory parenchyma proper, in the air sacs and alveoli, is mesenchymatous. When resolution occurs, epithelium plays no part in the phagocytic removal of foreign matter; this is done by monocytes, which tend later to coalesce and form giant cells before undergoing necrosis.—N. H.

PAGNINI, U. (1935). Contributo alla tecnica dell'esame batteriologico per la diagnosi della mastite streptococcica. [**Bacteriological Diagnosis of Mastitis (A New Medium)**].—*Clin. vet., Milano.* **58.** 964-974. [14 refs.]

The selective medium described is based on media proposed by KLIMMER, HAUPT and ROOTS [(1928). *Zlb. Bakt. I. (Orig.)* **107.** 206.] and by EDWARDS [this *Bull.* **4.** 303]. A batch contains the following ingredients :– 90 c.c. agar containing 1 g. of mannite and arabinose per 100 c.c., 10 c.c. of horse serum, 0·2 c.c. of 1 per cent. aqueous solution of crystal violet and 0·5 c.c. of 1 per cent. alcoholic solution of brom-cresol-purple. *Streptococcus agalactiae* does not alter the colour of the medium whereas *Str. lactis* and other streptococci turn it yellow. Streptococci may be further differentiated by growing them in broth to which various dyes have been added, *e.g.* Loeffler's blue, gentian violet, etc. *Str. lactis* grows profusely in broth and causes decolorization, especially of Loeffler's blue, whereas *Str. agalactiae* does not grow well and does not cause decolorization.—J. A. NICHOLSON.

STABLEFORTH, A. W., EDWARDS, S. J., & MINETT, F. C. (1935). **Studies on Bovine Mastitis. XI. Further Observations on the Control of Chronic Streptococcus Mastitis.**—*J. comp. Path.* **48.** 300-315. 8 tables. [12 refs.] [For abst. of previous article in this series, see this *Bull.* **4.** 693].

In 1933 [this *Bull.* **4.** 197.], the authors gave an account of a herd of about

50 cows from which chronic streptococcus mastitis due to *Str. agalactiae* had been eradicated by the segregation and eventual sale of infected cows. This herd is still free, and an account is now given of similar work in six other herds.

Latent infections were diagnosed by cultural examination of milk in blood agar plates or in a selective enrichment medium, supplemented by observation of the chemical reaction of the milk and of the amount and characters of centrifuge sediment. These were made at three- to six-monthly intervals and also, in three herds, shortly after calving. Infected animals were milked after the healthy ones in the same shed or were segregated and milked by different attendants.

One herd of about 80, in which the original incidence was 55 per cent., has now been free for three years. Another herd built up from healthy heifers early in 1933 is at present free. Four other herds of about 50 to 150 cows each, observed for four to five years, have continued to show new infections ; the annual incidence, however, having dropped by 1935 to 9·3, 7·0, 7·8 and 5·3 per cent. respectively.

The results are discussed in the light of the conditions in each herd and the degree of control that could be exercised. It is shown that the new infections were usually clinically insignificant. From experience in the herds and that reported in 1933, it is concluded :– (1) that chronic streptococcus mastitis may be eradicated by segregating infected cows or, if that is not possible, by milking them last, but that the chances of success are greatly increased if infected cows can be evacuated within a reasonable time : it is suggested that, if this cannot be done, infusion of the udder with a suitable bactericidal agent should be a useful aid ; (2) that *Str. agalactiae* may sometimes cause transient infections, detectable only by the use of an enrichment medium ; (3) that the disease does not arise sporadically and that new infections are due to errors in milking or to deficiencies in methods of diagnosis, and (4) that the formation of a separate heifer herd is a measure of the greatest value.

I. Mazzucchi, M. (1935). Le charbon hématique. [**Anthrax**].—*12th Int. vet. Congr. 1934.* **2.** 138-156. 2 tables. [English, German and Spanish summaries : abst. from orig. in French].

II. Vidal Munné, J. (1935). Les nouvelles méthodes de vaccination anti-charbonneuse. [**New Methods of Anti-Anthrax Vaccination**].—*Ibid.* 157-166. [English, German and Spanish summaries : abst. from orig. in French]. [A Spanish version appeared in *Rev. Hig. Sanid. pecuar.* **25.** 189-192].

III. —. (1935). **Discussion of Papers on Anthrax.**—*Ibid.* 167.

I. This paper is devoted to anthrax prophylaxis. After a preliminary discussion of the various methods of vaccination, the author proceeds to explain the principles of his new method of vaccination. The vaccine is known as the " carbozoo " vaccine and consists of a suspension of virulent anthrax culture in saponin. The object of the saponin is to bring about at the site of injection the early formation of gelatinous oedema which acts as a barrier against the rapid dissemination of the bacilli. Preliminary experiments with guinea pigs, rabbits, goats, sheep, horses and cattle have been very promising.

The first practical test of this vaccine was made in 1929 in the " Agro Romano " with 600 animals. So successful were the results that the vaccine was freely distributed and between January 1931 and January 1934 over two million animals in Italy were vaccinated, some in heavily infected areas. As a result, no deaths were recorded in these districts either from vaccination or from natural infection. The outstanding success of this vaccine has resulted in its being tried in most European countries, parts of Africa and Japan.

II. The author states that successful anthrax vaccination requires multiplication of the injected organisms at the site of inoculation and also that the organisms should develop capsules. This can be effected by the injection of large numbers of attenuated spores or non-sporing bacilli incorporated in some substance which will ensure the survival of the organisms for some time at the site of inoculation. It is essential that such vaccines should be innocuous.

" From experimental studies and extensive trials in the field, we can conclude that the intradermic inoculation clearly helps to produce an efficient state of immunity, either by a mechanism of strict specificity or by a physiological reason which inhibits temporarily the body defences from destroying the microbian multiplication."

III. In the discussion, Dr EICHHORN and Dr GERLACH spoke in favour of " carbozoo " vaccination. Dr EICHHORN stated that :—

" on over half a million vaccinations with this product in various parts of the United States, the results have been striking, so much so that, in localities where animals vaccinated with other methods have died of anthrax, others proved resistant to the natural infection following the immunization with Carbozoo. Doctor Gerlach, in his discussion, has rightly claimed Carbozoo as the most dependable product which not only could be employed before the disease appears but also can be effectively utilized for the control of the disease after it had already made its appearance in a herd.

I wish to compliment Dr. Mazzucchi on his work, which certainly will prove a most effective weapon for the control of disease in infected localities."

—GWILYM O. DAVIES.

CARPANO, M. (1935). **Anthrax Infection in Birds.**—*Bull. Minist. Agric. Egypt.* No. 153. pp. 18. 8 figs. on 4 plates, 1 table. [19 refs.]

The work recorded in this article confirms the findings of PASTEUR that birds are not susceptible to anthrax and that their resistance depends upon their relatively high body temperature.

The work done included the inoculation of fowls, pigeons and sparrows, and the testing of the blood of fowls for bactericidal properties.

The susceptibility of the ostrich is explained by the fact that, although a bird, its temperature is similar to that of mammals.—W. J. IRONSIDE.

RAMON, G., & FALCHETTI, E. (1935). Recherches sur le mécanisme de l'immunité anticharbonneuse obtenue au moyen du virus-vaccin incorporé dans la lanoline. **[The Mechanism of Anti-Anthrax Immunity Obtained by Virus-Vaccine in Lanoline].**—*C. R. Soc. Biol. Paris.* **119.** 1077-1080. [2 refs.]

The authors give a comparative account of the fate of Pasteur's first anthrax vaccine injected subcutaneously into rabbits, (a) in normal saline and (b) in lanoline. They found that the bacteria in lanoline remain for many days at the site of inoculation ; they do not pass into the circulation but form a culture. The presence of this culture produces a tissue response which results in the formation of substances similar to aggressins which are concerned with the development of a very strong immunity.—M. BURKE.

—. (1935). **Report of the Special Committee on Tuberculosis [Amer. Vet. Med. Ass.]**—*J. Amer. vet. med. Ass.* **87.** 468-470.

All counties of all states can be placed in the modified accredited area within the next two or three years, if sufficient funds are available.

Tuberculin testing was carried out on a larger scale during the 12 months under report. During the fiscal year ending June 30th, 1935, 25,237,532 cattle were tested and the reactors, totalling 1·5 per cent., were removed from the herds.

On that date, the fully accredited herds contained 3,514,242 cattle and there were 2,428 counties in the modified accredited area.

As regards tuberculosis in swine, the committee are of the opinion that probably 90 or 95 per cent. of the cases of tuberculosis discovered *post mortem* originate in the area where the avian type of tuberculosis is prevalent.

It has already been shown that swine are frequently infected with the avian type. Further work will be carried out to determine more definitely the manner in which the disease is spread from poultry to swine, or from one herd of swine to another.

The sensitization of cattle with the avian strain may have some bearing on the " no visible lesion " problem. More vigorous measures should be taken to deal with the avian disease.

The tuberculin used is grown on a synthetic medium and concentrated by heating : acknowledgement is made of DORSET'S work on this question.—F. H. M.

PLUM, N. (1935). Undersøgelse over svinetuberkulosen paa Bornholm i 1935. **[Swine Tuberculosis in Bornholm in 1935].**—*Maanedsskr. Dyrlaeg.* **47.** 431-437.

For more than a year Bornholm has been free from bovine tuberculosis. Tubercle bacilli were cultured from 100 cases of swine tuberculosis and all the strains proved to be of the avian type ; in 90 per cent. of these swine the lesions were limited to the lymph nodes of the alimentary canal ; in 9·25 per cent. there was evidence of generalization. Tuberculosis in fowls is rather wide-spread in Bornholm.—H. C. BENDIXEN (COPENHAGEN).

CHRISTIANSEN, M. J. (1935). Erfahringer og resultater ved tuberkulosebekaempelsen paa isoleret beliggende øer og i mejerikredse efter § 5 i lov af 26. Juni 1932 samt om de aviaere infektioners udbredelse blandt kvaeget paa disse øer. **[Control of Bovine Tuberculosis on the Smaller Islands and among Suppliers to Co-operative Dairies in Denmark. Avian Type of Infection in Cattle in these Areas].**—*Maanedsskr. Dyrlaeg.* **47.** 321-336.

Eleven islands with about 5,915 herds and 72,900 animals were free from bovine tuberculosis in 1935. Two other islands will probably have eradicated the disease by the end of 1935 when 6,800 herds with a total number of 83,000 cattle will be free. On Seeland and the island of Funen the suppliers of nine co-operative dairies with about 1,438 herds and 17,200 animals (cattle) are entirely free from tuberculosis of the bovine type. The procedure is analogous to that on the smaller islands, but precautions must be taken against infection from adjacent areas.

After the bovine type of infection had been eradicated, simultaneous intradermal tuberculin tests with bovine and avian tuberculin were carried out. The results of tests made on four of the islands are as follows :– Hjort : 8 herds (88·9 per cent.) showed avian infections ; 41 of the animals tested showed avian reactions (36·3 per cent. of the total number). The respective figures for the other three islands were :– Sejrø : 24 herds (20·1 per cent.) ; 44 animals (4·2 per cent.). Aerø : 265 herds (26·4 per cent.) ; 591 animals (5·6 per cent.). Taasinge : 185 herds (55·2 per cent.) ; 605 animals (12·9 per cent.).

Though it is more commonly young animals (calves and heifers) that are affected with the avian type, it is by no means unusual for older animals to give reactions to this type, but the reactions are on an average weaker.

—H. C. BENDIXEN (COPENHAGEN).

—. (1935). **Eradication of Tuberculosis in Dairy Cattle.**—*33rd Rep. med. Offr Hlth Durban, 1934.* pp. 48-53.

This report contains the outline of a scheme for the eradication of tuberculosis to be carried out over a period of five years. The scheme was to include :– (1) routine inspection of herds ; (2) slaughter of clinical cases ; (3) preliminary tuberculin testing with efficient separation of reactors and non-reactors ; (4) retesting of non-reactors at six-monthly intervals over a five-year period, with separation of reactors ; (5) testing of all replacements ; (6) regular and frequent examination of milk of individual reactors for tubercle bacilli, and (7) slaughter, without compensation, of all reactors secreting infected milk.

The scheme was to be confined to dairies equipped with the necessary facilities for maintaining efficient separation of reactors and non-reactors, and to dairies other than those from which reactors are eliminated forthwith upon recognition.—E. M. Robinson.

Kvapil, V. (1935). Boj s tuberkulozou a tuberkulinové skúsky. [**Control of Bovine Tuberculosis and Tuberculin Testing**].—*Zverolék. Obz.* **28.** 365-370.

Taking into consideration his own experience, the author refuses to use the intradermal and ophthalmic tuberculin tests either alone or in combination, as he considers them to be unreliable. When the cattle are at pasture the ophthalmic test cannot be applied, as a great number of the cattle show symptoms of conjunctivitis. The author considers that the subcutaneous test is the only reliable method. Cases of acute and generalized tuberculosis provoked by subcutaneous application of tuberculin are extremely rare.—E. Pribyl (Brno).

I. Northern Ireland. (1935). **Ministry of Agriculture. Report on the Spahlinger Experiments in Northern Ireland 1931-1934.** [Lamont, H. G., Kerr, W. R., & Shanks, P. L.] pp. 48. 27 tables, 11 charts. Belfast : H. M. Stat. Off. [fcp] [1s. 6d.]

II. —. (1935). **Spahlinger Vaccine in Northern Ireland.**—*Vet. Rec.* **15.** 1210-1211. [4 refs.]

III. Great Britain. (1935). **Agricultural Research Council. Observations by the Tuberculosis Committee on the Experiment with Spahlinger Vaccine in Northern Ireland.** pp. 6. London : H. M. Stat. Off. [8vo] [2d.]

IV. —. (1935). **The Spahlinger Experiments.**—*Brit. med. J.* Oct. 5th. 628-629. [2 refs.]

V. —. (1935). **Bovine Vaccination against Tuberculosis.**—*Lancet.* **229.** 892-893.

Thirty-two calves were used, all from tuberculin-tested herds, of which 18 were used in the main experiment with Spahlinger's " new simplified vaccine ". Two of the remainder were used for a preliminary estimation of the virulence of the test dose, whilst 12 were used for tests of four other vaccines, the value of which was regarded as uncertain at the outset, and which cannot be further considered in this short abstract.

Of the 18 calves used for the main experiment, 11 were injected with Spahlinger's " new simplified vaccine ", various routes and doses being used, and 7 were left as controls. Six months later, all received the same dose of virulent tubercle bacilli intravenously.

The difference in its effect on the two groups was striking. Of the 7 controls, 5 died of acute tuberculosis in 25 to 73 days, whilst 2, although passing through a febrile attack after about one month, survived and were slaughtered in good condition 763 and 879 days after the test dose. None of the 11 vaccinated animals

died from acute tuberculosis. One died 607 days after the injection of the test dose with tuberculosis of the lungs and meninges. Ten were slaughtered in good condition between the 783rd and 890th days ; one of these had a tuberculous udder and fairly wide-spread lesions. All animals showed some degree of tuberculosis *post mortem* and living tubercle bacilli were obtained from most of them. The lesions in the two controls which survived and in the ten vaccinated animals which came to slaughter were of a similar non-progressive nature.

The various commentators on these experiments all appear to agree that the striking difference in the behaviour of the controls and vaccinated animals provides a good case for further investigation, but point out the statistical inadequacy of the numbers and the lack of various data regarding the animals and vaccine, *e.g.* that there is no evidence to support what would be regarded by some as the most valuable character of the vaccine, *viz.* the claim that it is dead. Further experiments are necessary to determine the best dose and method of vaccination ; best age and whether it is safe to vaccinate shortly after birth ; the duration and degree of immunity to repeated natural infection and finally, whether, as suggested, tuberculin tests interfere with the production of immunity. Enforced, or even general, use of the vaccine at the present time is discussed in a foreword to I but is, needless to say, deprecated on all sides.—A. W. STABLEFORTH.

GENTILI, E. (1933). Otto anni di esperimenti e di vaccinazioni anti-tubercolari nei bovini della Provincia di Pavia, col metodo di Calmette e Guérin (B.C.G.). **[Eight Years' Trial with BCG Vaccination of Cattle in Pavia].**—*Notiz. Ist. antituberc. Milano.* **12.** 199-221. 2 tables. [2 refs.]

After preliminary experiments had established the harmlessness of BCG vaccine, a committee was set up to carry out further work and numerous experiments were made to determine the value of BCG as an immunizing agent. In one experiment, four calves were tied opposite to two cows known to be infected with open tuberculosis, two of the calves were vaccinated and, after nine months of these conditions, one vaccinated and one control animal were killed. The control showed extensive lesions in the lungs and bronchial and mediastinal lymph glands ; the vaccinated animal showed no evidence of tuberculosis and injections of material into guinea pigs failed to reveal the presence of tubercle bacilli in any of the organs. The same result was obtained when the other two animals were killed three months later.

Further experiments were carried out to compare the protecting properties of BCG with those afforded by killed human and bovine strains of tubercle bacilli. In these experiments, seven to eight weeks after vaccination calves were given a test dose of 3 to 5 mg. of virulent bovine bacilli intravenously ; three months later, when the majority of the other animals were affected with generalized tuberculosis, the vaccinated animals were healthy and, on being killed, showed at most induration of the pulmonary lymph glands. The author suggests that the numerous failures which have been reported when BCG is used in the field are due to the fact that the calves were already suffering from tuberculosis when vaccinated, and he quotes statistics to show that the incidence of tuberculosis has declined in Italy since the introduction of BCG vaccine.—J. A. NICHOLSON.

YANAGISAWA, K. (1935). **Studies on the BCG. (First Report).**—*Jap. J. exp. Med.* **13.** 591-600. 4 tables, 3 charts. [27 refs.] [In English].

The author reports that amounts of BCG up to 10 mg. failed to produce progressive tuberculosis in guinea pigs. Animals protected by the subcutaneous inoculation of doses varying from 0·0001 to 10 mg. were slightly more resistant

than controls to the injection of a virulent human culture. BCG had no appreciable curative action on infected guinea pigs.—R. E. GLOVER.

GERLACH, F. (1935). Critique de l'innocuité et l'utilité de la vaccination de bétail par le B.C.G. basée sur une expérience personnelle de dix ans. **[Ten Years' Experience of the Vaccination of Cattle with BCG].**—*Ann. Méd. vét.* **80.** 449-469.

This paper was presented at a congress of the Belgian Veterinary Union held in Brussels in August, 1935. It is in general terms and the points made by the author were :–(1) he has never observed that the vaccine is virulent ; (2) the vaccination is harmless and there is an absence of post-vaccinal reaction ; (3) vaccination has a beneficial effect on the health of calves during their years of growth ; (4) open and generalized tuberculosis have entirely disappeared from cattle vaccinated with BCG, and (5) there has been a considerable reduction in the percentage of tuberculosis since the method was introduced.

Commentaries were made by GUÉRIN on Gerlach's paper. [These are the same as those abstracted in this *Bull.* **6.** 102].—G. DODS MUNRO.

POTTER, T. S. (1935). **The Survival of Tubercle Bacilli Subjected to a Vacuum of High Order.**—*J. infect. Dis.* **57.** 149-159. [24 refs.]

Avian tubercle bacilli were used throughout the experiment. Quantities of growth from fresh cultures were transferred to small pyrex tubes sealed at one end. By methods described these were subjected to a vacuum of a high order, so that the amount of molecular oxygen was immeasurably small. The tubes were then sealed. In one case, in addition, fresh phosphorus-pentoxide was used to obtain a maximum amount of desiccation. Care was taken not to expose the tubes to light.

After storage for variable periods up to three months, the tubes were opened and cultural and biological examinations made of the contents. In cases where cultures were obtained direct there did not appear to be any change in the rate of growth. In all cases, inoculation of the material into pigeons, rabbits or mice proved the presence of viable tubercle bacilli, and cultures were obtained from the lesions produced.

This article also contains a critical account of experiments on similar lines carried out by other workers.—P. L. SHANKS.

LINE, C. B. (1935). **The Growth of Mycobacterium paratuberculosis in Tissue Cultures.**—*Tech. Bull. Mich. agric. Exp. Sta.* No. 142. pp. 30. 20 figs. on 10 plates. [16 refs.]

Young cultures of *M. paratuberculosis* (bacillus of Johne's disease) were grown in explants of guinea pig spleen in a plasma clot (chicken or guinea pig) plus embryonic extract plus guinea pig serum. The technique of MAXIMOW was followed [(1924). *J. infect. Dis.* **34.** 549]. After growth of the cells had taken place, the cultures were fixed, embedded and sectioned. The following is a brief description of the changes which were observed :–

" Almost immediately after explantation, cells began to migrate into the surrounding medium. These consisted mainly of leucocytes, chief among which was the polymorph. . . . They showed a remarkable affinity for the Johne's bacilli, and, where clumps of the organisms were within migration range of the explant, they were surrounded by dense masses of leucocytes. . . . This active migration of leucocytes was observable during the first 24 to 36 hours, after which these cells, although still present in the culture, degenerated rapidly, lost most of their activity, and were obscured by an active migration of macrophages from the explant. The latter arose both through the transformation of lymphocytes and from the reticular

tissue. . . . They could be seen accumulated in large numbers around clumps of bacteria, and ofttimes it was observed in the live culture that their cytoplasms fused, forming a multinucleated or giant cell."

The organisms were frequently found within the macrophages, but little evidence of their digestion and destruction could be detected : in fact, in many cases, the bacilli seemed to multiply within the cells. It is suggested that the heavy inoculum used to initiate the cultures may have overcome the resistance of the cells. It is also pointed out that there may be a difference in the behaviour of *M. paratuberculosis* in the tissues of an animal which is naturally refractory (guinea pig) when compared with bovine tissues.—R. E. GLOVER.

I. SABIN, F. R., SMITHBURN, K. C., & THOMAS, R. M. (1935). **Cellular Reactions to Wax-Like Materials from Acid-Fast Bacteria. The Unsaponifiable Fraction from the Tubercle Bacillus, Strain H-37.**—*J. exp. Med.* **62.** 751-769. 2 plates, 2 tables. [13 refs.]

II. SABIN, F. R., SMITHBURN, K. C., & THOMAS, R. M. (1935). **Cellular Reactions to Waxes from Mycobacterium leprae.**—*Ibid.* 771-786. 4 figs. on 1 plate, 4 tables. [6 refs.]

I. The authors have extended previous work on cellular reactions to fractions isolated from tubercle bacilli [see this *Bull.* **2.** 640]. Using an unsaponifiable wax-like material – really a hydroxy acid – obtained from a human strain of tubercle bacillus (H-37), they injected it intraperitoneally into rabbits and studied the reactions of the peritoneum, especially the omentum. The reactions of various tissues to similar material given intravenously were also studied.

They found that the material used stimulated the formation of monocytes wherever it lodged in the tissues. These monocytes then fused around the wax and became foreign-body giant cells. Within these the wax slowly disintegrated, but did not appear to damage the cells.

The effect of the unsaponifiable material, when injected intravenously, on the course of subsequent infection with bovine tubercle bacilli was studied and it was found that the wax appeared to have no effect on the resistance of the body.

II. In the case of waxes from *M. leprae*, materials were used in different stages of purification and the complex cellular reactions to mixtures of substances compared with the simple response to highly purified material. The crude wax gave reactions which included the types of cell characteristic of the responses to tuberculo-polysaccharide, phosphatide and wax. Leprin, a solid glyceride obtained by the purification of the crude wax, corresponded in its properties to the unsaponifiable material from the tubercle bacillus.—A. ROBERTSON.

I. HELMREICH, W. (1935). Ueber das Vorkommen von echten Diphtheriebazillen bei Haus- und Laboratoriumstieren. [**The Occurrence of** *Corynebact. diphtheriae* **in Domestic and Laboratory Animals**].—*Zlb. Bakt. I.* (*Orig.*). **135.** 65-69. 2 tables. [9 refs.]

II. VON OSTERTAG, R. (1935). Kommen echte Diphtheriebazillen bei unseren Haustieren vor ? [**Occurrence of** *Corynebact. diphtheriae* **in Domestic Animals**].—*Z. Fleisch- u. Milchhyg.* **46.** 61-62.

III. ZURUKZOGLU, S., & MÜNDEL, O. (1935). Ueber das Vorkommen von Diphtheriebazillen bei Pferden. (Ein Beitrag zur Frage Entstehung von Normalantitoxinen). [**The Occurrence of Diphtheria Bacilli in Horses. A Contribution to the Question of the Origin of Normal Antitoxin**].—*Schweiz. med. Wschr.* **65.** 559-560. [13 refs.]

I. A record has been made of the examination of 1,002 animals for the

presence of diphtheria bacilli. Wounds of 22 horses were found to be contaminated with this organism, usually of the *mitis* type ; ten other horses were carriers. Three bovines, two dogs and one sheep were also carriers. Except for three horses which showed glandular infection, the remaining 13 carriers showed infection of the mucous membranes.

II. It is emphasized that domestic animals may be carriers of true diphtheria bacilli.

III. The authors succeeded in isolating true diphtheria bacilli of the *mitis* type from the nasal mucosa of two horses out of a total of 100 examined. In view of this and of similar findings of other workers [see I and II], the authors consider that the diphtheria antitoxin frequently found in the blood of apparently normal horses is due to specific immunization which has taken place naturally. Applying this to antibodies in general, they consider that all normal antibodies are the products of specific immunization and that their presence is not due to a physiological phenomenon, as advocated by HIRZFELD and others.—E. J. PULLINGER.

HELLESNES, P. (1935). Rødsykebakterieinfeksjon hos lam. [**Infection in Lambs with the Bacillus of Swine Erysipelas**].—*Norsk VetTidsskr.* **47.** 516-528. 2 tables. [8 refs.]

During investigations carried out at the State Veterinary Clinic, Oslo, the specific polyarthritis in young lambs caused by *Erysipelothrix rhusiopathiae* (swine erysipelas bacillus) is found to be of rather common occurrence in certain parts of Norway ; the disease often appears as a real enzootic, especially when the lambing is allowed to take place under unhygienic conditions or on fields recently treated with pig manure. The lesions following the infection are always found to be localized to one or more joints, and the causal organism has been shown to be indistinguishable from that isolated from pigs. Lambs were easily and typically infected by subcutaneous, intravenous and umbilical inoculation of pure cultures, but not by oral administration. A young kid that had been infected intravenously showed, besides joint lesions, a septicaemic infection. Four out of five lambs treated with immune serum before infection were not affected, whereas the fifth died three weeks later showing vegetations on the semilunar valves of the heart. Under farm conditions, serum treatment has been tried as a cure with promising results.—GUSTAV NAERLAND (FARSUND).

MUNCE, T. W. (1935). **Swine Erysipelas.**—*J. Amer. vet. med. Ass.* **87.** 512-521. [16 refs.]

This paper deals with the clinical aspect of the disease as it occurs in South Dakota, Iowa and Nebraska. From the evidence he has gathered, Munce is of the opinion that in America the disease is increasing in virulence and in consequence pig-raising has been rendered unprofitable on some farms.—G. DODS MUNRO.

VAN SACEGHEM, R. (1934). La dermatose, dite contagieuse, des bovidés. Impétigo tropical des bovidés. [**Contagious Bovine Dermatitis. Tropical Impetigo of Cattle**].—*Bull. agric. Congo belge.* **25.** 590-598. 1 fig. [7 refs.]

An inflammatory condition of the skin of cattle, referred to as contagious bovine dermatitis, has been reported by the author and other writers as occurring in the Belgian Congo, Tanganyika, Northern Rhodesia and other parts of Africa since 1910. It is characterized by scab formation, localized or generalized, and must be differentiated from the various forms of mange and ringworm [see references to " Senkobo scab ", this *Bull.* **3.** 161]. It principally affects cattle, but sheep, goats and even horses may be affected. It is most prevalent in wet

seasons and tick bites favour infection. Death occurs in serious cases. The causal organism *Tetragenus congolensis*, formerly called *Dermatophilus congolensis*, is a pleomorphic organism showing coccus and filamentous forms. Local lesions have been produced experimentally, using cultures and also fresh material from natural lesions on scarified areas. Filtrates gave negative results. The author suggests that the condition should be called tropical impetigo rather than contagious bovine dermatitis.—J. W. H. Holmes.

I. Heck, J. H. (1935). Vaccinatie van buffels tegen septichaemia epizoötica in een gedeelte van de onderafdeeling Bone in het errste halfjaar 1934. [**Vaccination of Buffaloes against Haemorrhagic Septicaemia in the Bone District, Dutch East Indies, January to June, 1934**].—*Ned.-ind. Bl. Diergeneesk.* **47.** 187-193.

II. Bonga, B. (1935). Die preventieve vaccinatie tegen septichaemia epizoötica in het ressort Makassar gedurende de maanden Augustus en September 1934. [**Vaccination against Haemorrhagic Septicaemia in Makassar, Dutch East Indies, in August and September, 1934**].—*Ibid.* 193-196.

I. In the Bone district, 21,141 buffaloes and 44 cattle were vaccinated. Two animals contracted infection as a result of the inoculation and all except 183 animals resisted natural infection for the next six months.

II. All 5,692 buffaloes and 26 head of cattle vaccinated in the Makassar district survived natural infection during the next six months.—E. J. Pullinger.

Wall, S. (1935). Om ympning med ett för svin blott ringa virulent ympämne som stridsmedel mot pasteurellainfektion hos svin. [**Vaccination against Swine Plague**].—*Skand. VetTidskr.* **25.** 597-614. 3 tables. [English summary : abst. from orig.]

The author decided to undertake this series of experiments as he had at his disposal two different strains of pasteurella, both primarily isolated from naturally diseased pigs. The first one, called the Bt strain, was highly virulent for mice but slightly so for pigs, whereas the second one, called the Närke strain, was highly virulent for pigs and less so for mice. Using the pure Bt strain suspended in sterile saline as a vaccine, an increased resistance was found to have become established against the subsequently inoculated Närke strain. When this resistance was seen within the first week after vaccination, the author suggested that a peculiar antagonism must be operating between the two strains. In about three weeks, this antagonism was thought to have disappeared and to have been substituted by an active immunity. The results of the experiments are, however, not fully convincing, and further research seems necessary.—G. Naerland (Farsund).

Debelić, S. (1935). Kolera peradi (Cholera gallinarum) u Jugoslaviji. [**Fowl Cholera in Yugoslavia**].—*Vet. Arhiv.* **5.** 571-575. 2 tables, 1 chart. [Abst. from German summary].

The official statistics for 1924 to 1928 show that fowl cholera occurred constantly or intermittently in 30 departments, while during this period three departments were free.

Köves, J. (1934). A malacok hevenyés paratyphusáról. [**Acute Paratyphoid of Piglets**].—*Allatorv. Lapok.* **57.** 345-347.

The author calls attention to the increasing incidence of paratyphoid in piglets, this disease now being prevalent even in herds maintained under good conditions. Recent observations show that, in young animals, paratyphoid is in

most cases combined with another disease characterized by pox-like eruptions. The nature of the latter is still to be cleared up, especially as regards its possible role in the course of paratyphoid infections. This is the more desirable, as the differential diagnosis of paratyphoid and swine fever still causes difficulties, particularly in cases when lung lesions are absent, or when the spleen shows a hyperaemic or hyperplastic swelling besides other lesions characteristic of swine fever. In cases of mixed infections, inoculation against swine fever may prove dangerous even if carried out with serum alone. In spite of the losses which may arise following the treatment of mixed infections, farmers prefer in such doubtful cases the use of the simultaneous serum-virus inoculations against swine fever with a view to preventing subsequent losses from this disease.—A. KOTLÁN (BUDAPEST).

I. CLARENBURG, A. (1935). **Paratyphoid Diseases in Animals in Relation to Public Health.**—*12th Int. vet. Congr. 1934.* **2.** 218-230. [3 refs.] [French, German and Spanish summaries].

II. MURRAY, C. (1935). **Classification of the Paratyphoid Diseases.**—*Ibid.* 230-247. 1 table. [Numerous refs.] [French, German and Spanish summaries].

III. STANDFUSS, R. (1935). Systematik der Tierparatyphosen (Paratyphuserkrankungen der Haustiere). [**Paratyphoid Infections of Domestic Animals**]. —*Ibid.* 248-266. 1 table. [English, French and Spanish summaries : abst. from orig. in German].

IV. VERGE, J. (1935). Classification des maladies paratyphiques. [**Classification of Paratyphoid Infections**].—*Ibid.* 267-279. [English, German and Spanish summaries : abst. from orig. in French].

V. —. (1935). **Discussion of Papers on Paratyphoid Diseases.**—*Ibid.* 279-281.

I. The relation of food poisoning in man to salmonella infections in animals is discussed. There is a difficulty regarding classification except from the point of view of the causative type of organism. Regarding the question of carrier animals, it is pointed out that salmonella are observed in the intestinal canal in only a small percentage of clinically healthy cattle and that their occurrence is probably due to close contact with sick calves. Meat is considered to be the most important vehicle of salmonella food poisoning, outbreaks caused by milk, eggs and the products prepared from these being of secondary importance. These points are considered in detail ; in regard to meat, the *ante-mortem* infection of the animal is considered to be of primary importance, as in Holland few cases of meat poisoning occur owing, in the author's opinion, to the bacteriological examination of meat of animals slaughtered in an emergency. Although milk may also be infected with salmonella, the opinion obviously held is that human carriers play a greater part either in infecting the cow or the actual milk. Eggs of pigeons and ducks may, in certain circumstances, contain either *S. typhi-murium* or *S. enteritidis* and infection in human beings follows their consumption when the food containing them has been insufficiently heated.

Diagnosis in slaughtered or dead animals may be effected by bacteriological examination of the faeces and a serological test of the serum may also be carried out. As normal agglutinins may occur, the author advocates heating the serum at 56°C. for half an hour to destroy these normal antibodies. [This is contrary to the experience of LOVELL – this *Bull.* **5.** 437]. It is suggested that compulsory notification of salmonella infection in animals, adequate differentiation of salmonella which occur in man and animals, and collaboration between physician, veterinarian and police is necessary to combat infection in man due to salmonella from animals.

II. This author gives the classification of the genus *Salmonella* according to

BERGEY, who differentiates on biochemical grounds. [This is contrary to the usual method of classification which is on serological grounds]. Paratyphoid diseases of animals of importance in America are discussed, particularly infection of swine with *S. cholerae-suis*, and its association with the virus of swine fever. The carrier condition is considered to be uncommon, which is in accordance with the views of modern observers. Brief references are given to infection of mares with *S. abortus equi* and infection of fowls and turkeys with *S. gallinarum*. In California, this disease of turkeys is of greater importance than enterohepatitis and corresponds aetiologically to fowl typhoid. Further details concerning the infection of adult cattle and calves with *S. enteritidis* are recorded. [The Dublin variety is probably more frequently the cause of disease in calves]. *S. enteritidis* has also been reported as a cause of gastro-enteritis in horses and mules. Keel disease in ducks due to *S. anatum*, a disease of sheep due to *S. typhi-murium* and a colitis of foals and infection of turkeys due to this latter organism are also briefly dealt with. Finally, a brief outline of the aetiology, transmission and methods of diagnosis of infection due to *S. pullorum* is given.

III. The classification in this paper is in accordance with modern thought. The Kauffmann classification based on antigenic analysis is given and it is pointed out that each type of bacterium does not correspond to a definite paratyphoid disease. A list of bacteria of interest in animal disease, followed by a classification based on the needs of the clinician, are given.

Primary paratyphoid diseases of animals include calf paratyphoid, equine and ovine abortion, and the paratyphoid diseases of swine, fowls and mice. Bovine enteritis receives a special section and it includes as causes *S. typhi-murium* and the variants of *S. enteritidis*. The third section deals with secondary paratyphoid diseases, the important one being *S. cholerae-suis* infection in swine.

Among the infective agents for calves and bovines is included *S. paratyphi* B, which is considered by most observers to be exclusively a human pathogen.

IV. Verge classifies paratyphoid diseases according to whether they are (a) especially pathogenic for human beings and seldom found in animals, or (b) pathogenic for both man and animals.

In the latter group are included such organisms as *S. abortus equi* and *S. abortus ovis* which are non-pathogenic for human beings. He stresses points which are important in the control of salmonella disease of animals, namely, the identification of bacterial species, estimation of their virulence, their mode of action and their transmission to man. Emphasis is also given to tabulation of the measures of prophylaxis that may be applied as far as they concern human beings and animals.

V. The discussion on these papers was opened by DAUBNEY, who referred to the absence of *S. cholerae-suis* from pigs which developed intestinal lesions in swine fever in East and South Africa. His second point concerned the relative resistance of European and American breeds of fowls as compared with the great susceptibility of the indigenous fowls of East Africa to fowl typhoid, a disease apparently introduced by birds from Europe. His third point dealt with the Dublin type of infection in calves in East Africa, the reduction of mortality by hygienic measures coupled with vaccination and the importance of the carrier cow. This was followed by a statement from LOVELL, who dealt with the importance of the antigenic structure of salmonella bacteria which, although complicated, was the only satisfactory basis of classification. The hope expressed that international agreement might help to stabilize the chaotic condition of the nomenclature has been realized [this *Bull.* **5**. 63]. A brief outline is given indicating the wide-spread prevalence of the group in animals and man. The difficulties of diagnosis by use

of the agglutination reaction are also mentioned, largely because of the presence of normal agglutinins in the sera of healthy animal subjects.

Finally, as immunization by a specific fraction of salmonella bacilli has proved to be of value experimentally, it is hoped that this step forward may have a practical application.—R. LOVELL.

—. (1935). **Fifteenth Annual Report on Eradication of Pullorum Disease in Massachusetts.**—*Bull. Mass. agric. Exp. Sta.* No. 78. pp. 12. 6 tables. [1 ref.]

During 1934, 302,237 tube agglutination tests were carried out on birds belonging to 247 flocks, the percentage of reactors being 0·39, the lowest so far attained.

It was found that, to maintain freedom from infection in non-reacting flocks, the continuance of annual testing was necessary.

In the experiments it was not found possible to transmit the disease to non-reacting fowls by exposure to litter contaminated with the faeces of reactors, and it was only transmitted with difficulty when the faeces were forcibly fed.—E. W. A.

BRILL, J., CIURA, J., & SKOCZEK, A. (1935). Badania nad biala biegunka pisklat i tyfusem drobiu. [**Research on** *Salmonella pullorum* **and** *S. gallinarum*]. —*Wiad. weteryn.* **14.** 369-394. 9 tables. [Numerous refs.]. [French summary : abst. from orig.]

In order to ascertain the differences between *S. pullorum* and *S. gallinarum* and to test all serological and cultural aids to their identification, the authors examined 24 strains isolated from cases of *S. gallinarum* infection in fowls and *S. pullorum* infection in young chickens. It has been stated that all these strains contain thermostable antigens described by WHITE and KAUFFMANN as IX-8 [see this *Bull.* **5.** 63]. On maltose, dulcite, dextrin and a special agar medium, colonies of *S. pullorum* and *S. gallinarum* can be distinguished.—K. SZCZUDLOWSKI (LWÓW).

DUBOIS. (1935). La brucellose. [**Brucella Infections**].—*Rec. Méd. vét.* **111.** 793-821. [Numerous refs.]

This is a review of recent French publications upon brucella infections, largely those of the author, complementary to that made by RINJARD [this *Bull.* **4.** 460].

In France, these infections have been found in cattle, sheep and goats, but swine and horses are doubtless also affected. Infection of cattle and of sheep and goats is usually with the bovine strain of *Br. abortus* and with *Br. melitensis* respectively, though this is not an invariable rule.

The author says that the pathogenic action of all types of brucella is the same for man, for which reason he rather discounts HUDDLESON's work.

Allergic skin reactions have been used successfully on goats, sheep, cattle, pigs, horses and poultry, the agent being a heat-killed culture of the porcine strain of *Br. abortus* in physiological saline ($10^9$ per c.c.). The test dose for cattle is 0·7 c.c., and for sheep and goats 0·3 c.c. injected intradermally into a caudal fold. A state of anergy to the test may exist in animals when debilitated from various causes other than brucella infection.

Premunition of sheep has been effected with a living non-virulent porcine strain of *Br. abortus* sensitized with anti-*abortus* serum. The concentration of bacteria was $10^9$ per c.c., and the dose for ewes if in early pregnancy was 1 c.c. and, if non-pregnant, from 1·5 to 2 c.c. The author states that experimentally vaccinated animals do not transmit infection to human and animal contacts. [This statement is likely to be disputed].

Mention is made of a double premunition method against sheep pox and brucella infection of sheep by the use of a mixture of sensitized vaccines against both diseases.

A preventive vaccine for brucella infection in human beings, made from human, ovine and caprine strains of *Br. melitensis* and bovine and porcine strains of *Br. abortus*, has been used in various parts of France with successful results. Three doses of this vaccine have usually been given.

A new preventive vaccine for animals, prepared according to the method of Vallée and Rinjard for their vaccine against Johne's disease, is to be tested shortly.—C. V. Watkins.

Wagener, K. (1935). Die Verbreitung der Abortusinfektion (Bang-Infektion) in den kurmärkischen Rinderbeständen. [**Incidence of Bovine Contagious Abortion in Brandenburg**].—*Tierärztl. Rdsch.* **41.** 481-483. [9 refs.]

The investigation covers the years 1933 to 1935. Of 100 herds containing 4,479 animals, 16 per cent. of the herds, containing 11·6 per cent. of the total number of animals, were entirely free from infection. Of the remaining herds, 12 per cent. were lightly infected, 44 per cent. showed a medium degree of infection, whilst 27 per cent. were heavily infected, *i.e.*, they contained more than 30 per cent. of reactors.—E. J. Pullinger.

Thomsen, A. (1935). Den nye felttogsplan mod den smitsomme kalvekastning i Norge. [**The New Eradication Plan for Bovine Contagious Abortion in Norway**].—*Maanedsskr. Dyrlaeg.* **47.** 438-444. [1 ref.]

The article conveys nothing really new as it is solely an abstract, with some comments, of the new regulations now in operation in Norway, the aim of which is claimed to be total eradication of *Brucella abortus* infection. These regulations have already been dealt with in this *Bull.* **5.** 794.—Gustav Naerland (Farsund).

Veenbaas, A. H. (1935). Diagnostiek en bestrijding van de Abortus Bang in Friesland. [**Diagnosis and Control of Bovine Contagious Abortion in Friesland**].—*Thesis, Utrecht.* pp. 150. 2 figs. on 2 plates, 26 tables 4 charts. [Numerous refs.] [English summary : abst. from orig.] [An abbreviated version appears in *Tijdschr. Diergeneesk.* **62.** 1077-1084].

The second paper is a précis of the thesis. The author, as Director of the Livestock Health Service in Friesland for 15 years, has had considerable experience in the control of both bovine tuberculosis and bovine contagious abortion.

Diagnosis.—Of the serological and allergic tests the slow tube agglutination test is the most reliable : it works best with unheated serum and carbolized antigen. There is a correlation between udder infection and the blood agglutination titre : udder infection is never found with a blood titre of 1 : 100 or less. The guinea pig test for aborted material is more reliable than culture.

Curative Treatment.—Chemotherapy and immune serum therapy have been found useless.

Vaccination.—The use of dead vaccine is of potential value in removing the infection from animals already infected.

Considerable experience has shown that inoculation of live vaccine into heifers at least three months before service has caused a marked fall, and often complete cessation, of abortions in an infected herd. One vaccination exerts its action over more than one pregnancy and the infection so caused dies out after a time : results do not allow a definite figure to be given ; a period of six months was often recorded. Vaccination is certainly very valuable in preventing the losses of calves.

Several records of the course of infection in vaccinated herds and their breeding history are given.

In 1935, 114 herds in Friesland, containing over 4,000 cattle, were under systematic control. The percentage of reactors was 16. Eradication by serum tests and hygienic methods is practised where possible, and vaccination is used in herds where segregation is impossible and infection is severe.—J. E.

FRITZ, B. S., & BARNES, M. F. (1935). **Bang's Disease Control in State Institution Herds. III and IV. Progress Reports on the 16 Herds for 1931 and 1932.** —*J. Amer. vet. med. Ass.* **87.** 542-558. 10 tables. [2 refs.] [For abst. of previous article in this series, see this *Bull.* **4.** 604].

These reports describe the progress in the control of *Brucella abortus* infection in herds owned by Pennsylvania State institutions, but more herds are included than in previous reports.

Most of the records are given in tables and do not lend themselves to abstraction. In 1931, there were 16 herds and in these herds 572 cows calved. The average interval between successive calvings was 13·18 months and the number of services to each pregnancy averaged 1·43. In 1932, 712 cows calved with an average interval of 12·85 months, the average number of services to each pregnancy being 1·47. Abortions from causes other than *Br. abortus* infection numbered 2·78 per cent. in 1931 and 2·3 per cent. in 1932. One herd became reinfected and, within the two-year period, 50 per cent. of the cattle in this herd reacted.

—GWILYM O. DAVIES.

FLÜCKIGER, G. (1935). Die Bekämpfung des Rinderabortus Bang und des gelben Galtes der Milchkühe in der Schweiz. [**Control of Bovine Contagious Abortion and Mastitis in Switzerland**].—*Schweiz. Arch. Tierheilk.* **77.** 533-562.

In July, 1932, the Swiss federal governmnet took its first official step in the control of brucella infection and mastitis. In August, 1935, an official order guaranteed a sum of Fr.600,000 for the period ending 1937 as a contribution towards the costs of the campaign against these diseases. The federal government will contribute 50 per cent. of the cost of examination of all herds participating in the control scheme and pay 80 per cent. of the market value of any animal slaughtered in the process of cleaning up a herd. This compensation is fixed by the local cattle organizations, when possible, or by a committee of three consisting of an official veterinary officer and representatives of agriculture and the cattle trade respectively.

The Federal Department of Public Economy [" Volkswirtschaftsdepartement "] states the conditions under which the control scheme should be operated. Owners desirous of supporting the scheme must inform the cantonal veterinary officer and undertake to observe all the regulations for a period of three years. Veterinary officers and bacteriological laboratories are responsible for all examinations and tests, and must furnish reports of their findings. Vaccination is forbidden.

The technical measures, which are controlled by the Federal Veterinary Department [" Veterinäramt "], follow orthodox lines and provide for agglutination tests, serological and bacteriological examination of milk, disinfection of stables and the issuing of certificates to guarantee the freedom of the herd in question from brucella infection and mastitis.—M. BURKE.

I. BANG, O. (1935). **New Researches on Contagious Abortion (Bang's Disease).**—*12th Int. vet. Congr. 1934.* **1.** 262-282. [Numerous refs.] [French, German and Spanish summaries].

II. Cotton, W. E. (1935). **New Researches and Developments on Contagious Abortion (Bang's Disease).**—*Ibid.* 283-297. [12 refs.] [French, German and Spanish summaries].

III. Finzi, G. (1935). **New Researches on Contagious Abortion (Bang's Disease).**—*Ibid.* 297-310. [7 refs.] [French, German and Spanish summaries].

IV. —. (1935). **Discussion of Papers on Bang's Disease.**—*Ibid.* 310-314.

I. Since these reports are largely reviews of matters which have already been published in greater detail, no attempt will be made to do more than indicate the scope and more important points. Bang deals with the distribution of *Brucella abortus* in the body of the cow and amongst the various species, referring particularly to his own experiments with Bendixen and Ørskov [this *Bull.* **4.** 648.] in which heifers were artificially infected *per os* and killed for bacteriological examination at intervals, and to those of Zeller and Beller [this *Bull.* **5.** 405.], who agreed that a generalized infection occurs which culminates at about three weeks, though even at that time *Br. abortus* is only present in small numbers and symptoms are few or absent. It is concluded that generalized infection is usual, except in those cases where it is held up at the regional lymph glands. The paths of infection are dealt with, emphasis being given to the probable practical importance of infection through the skin and to the fact that *Br. abortus* may remain in the genital tissues of non-pregnant animals for as long as seven to 15 months.

Infection of non-pregnant heifers, naturally or by vaccination, may result in the udders becoming infected, but subsequent milk yield is not affected and the disturbance of chlorides, cells, etc., is slight.

Diagnosis and type determination are also dealt with.

II. Cotton covers much of the same ground as Bang. He deals with the avenues of infection, emphasizing the importance of the conjunctiva and skin, the presence of *Br. abortus* in the blood stream of cattle and swine, the relation between bovine and porcine abortion, *Br. abortus* lesions in swine, vaccination of the adult and calf, state control including the new federal plan for eradicating the disease and, finally, human infection. This he regards as a minor health problem in the United States of America.

Intimate exposure of cattle to infected and aborting swine, which infected other swine, caused only slight temporary blood reactions in the cattle. Attempts to isolate *Br. abortus* from the blood of infected pregnant cows failed, except in two animals which had been given *Br. abortus* intravenously. The organism was obtained fairly regularly from boars and sows ten to 45 days after infection. Bone lesions, unaccompanied by other lesions, are reported in swine.

Vaccine from avirulent strains has given indifferent results, but that from strains of low virulence induced substantial and lasting immunity without, except in rare instances, invading the udder. Calfhood appears to be the best time for the use of vaccine.

It is suggested that research should aim at a more accurate and less cumbersome means of detecting infected animals and in particular udder infection, further study of possible ways of infection and their importance, of the distribution of *Br. abortus* in the body, the exact relation of swine and bovine abortion and the possibility of yet other species acting as reservoirs. Practical methods of control and eradication should be perfected but, at the same time, efforts should be made to find a safe and effective method of immunization.

III. Finzi deals with diagnosis, chemotherapy and vaccination. He considers that the method and materials used for the agglutination test should be standardized, but that the allergic method is best because it need not be carried out in the

laboratory. He favours the use of " anabortin ", a formalinized product, and prefers the double intradermal method in the caudal fold. Standardization is, however, also necessary for this test. In his experience, living vaccines are dangerous and dead vaccines nearly useless. Favourable results claimed for chemotherapy or vaccination have generally been due to improved sanitary measures.

IV. HOLTH dealt with the history and control of bovine abortion in Norway, showing that, although notification was officially required in 1903, the law was not effective until, diagnostic methods having been made certain, popular opinion was educated to the importance of controlling the disease. Warranty of freedom from contagious abortion is now frequently required and sellers are often heavily penalized for selling infected cattle. As a result of blood testing carried out privately or with state assistance, infection has declined very greatly and the disease has been eradicated in several counties.

ZWICK referred to the virtual discontinuance of the use of living vaccine in Germany. Graded milk must be free from *Br. abortus*. Reference was made to diagnostic methods and to typing.

STECK stated, among other things, that he had not been able to find any direct connexion between the udder infection with *Br. abortus* and with *Streptococcus agalactiae*.—A. W. STABLEFORTH.

PEDERSEN, H. O. (1935). Fortsatte undersøkelser over abortinfektionen i yveret hos koen. [**Further Research on** *Brucella abortus* **Infection of the Udder in Cows**].—*Skand. VetTidskr.* **25.** 565-593. 1 text fig., 12 figs. on 6 plates, 3 tables. [10 refs.] [English summary : abst. from orig.]

The material for these investigations consisted originally of two pregnant heifers and five young heifers which were vaccinated twice with an interval of a fortnight with living *Br. abortus* before being served. In two of the cases the udder secretion was examined during pregnancy, and in all cases it was examined at intervals throughout the lactation period or until slaughter. Finally, all the animals were killed and their udders examined histologically. *Br. abortus* was present in the mammae of five of the seven animals (18 of 27 quarters examined). The highest bacterial counts were made from the strippings.

Three quarters became free from infection during the lactation period, whereas the organisms were still present in the remaining 15 at slaughter from five and a half to 25 months after infection. Histological alterations were demonstrated in all these 15 continuously infected quarters, including one of the hind quarters from each of two condemned, older cows.

The author concludes that the results of the work demonstrate that the presence of *Br. abortus* in the cow's udder produces a chronic proliferative inflammation which, although not clinically demonstrable in most cases, not infrequently leads to a lower milk yield of the respective quarters.—G. NAERLAND (FARSUND).

DAVESNE. (1935). Essais de traitement de l'avortement épizootique des bovidés par un vaccin avirulent. [**Use of an Avirulent Vaccine against Bovine Contagious Abortion**].—*Bull. Soc. vét. prat. Fr.* **19.** 242-246. 1 table. Discussion pp. 272-273.

The author describes the therapeutic use of a proprietary vaccine, " brucelloxine ", said to be an autolysate of *Brucella abortus*, to which is added formol-killed culture. The exact details of its preparation are not stated.

A small number of animals were treated and no controls were kept : the results are said to have been satisfactory.—C. V. WATKINS.

Brancato, F. (1934). Ricerche istologiche su sacchetti di collodio contenenti culture di Brucella abortus. [**Histological Studies on Collodion Sacs Containing Cultures of** *Br. abortus*].—*Ann. Med. nav. colon.* **40.** 1-7. 5 figs. [6 refs.] [Abst. from abst. in *Bull. Inst. Pasteur.* **33.** 726].

Collodion sacs containing a culture of *Br. abortus*, introduced into the peritoneum of guinea pigs and left for ten to 30 days, were removed intact, the brucella not having invaded the body.

I. Poppe, K. (1935). Bangsche Krankheit – Brucellosen. Epidemiologie, Pathogenese, Diagnose, Therapie, Bekämpfung. [**Bang's Disease**].—*Wiss. Woche Frankfurt, 1934.* **3.** 148-161. [Numerous refs.]

II. Kristensen, M. (1935). Kurze Mitteilung zum Vortrag Poppe. [**Comments on Poppe's Paper on Brucella Infection**].—*Ibid.* 161-164. 2 tables. [1 ref.]

III. Olin, G., & Kling, C. A. (1935). Das Undulantfieber in Schweden. [**Undulant Fever in Sweden**].—*Ibid.* 164-168. [3 refs.]

IV. Simić, T. V. (1935). Bangsche Infektion in Jugoslawien. [**Bang's Disease in Yugoslavia**].—*Ibid.* 168-169. Discussion pp. 169-170.

I. Epidemiological, diagnostic and therapeutical aspects of human brucella infection are discussed. Readers are referred to the original article. Note is made of one single authentic case of abortion in a pregnant woman as a result of infection with *Br. abortus*. Control of human brucella infection can only be effected by successful eradication of the disease in animals.

II. Figures are quoted to indicate that seasonal fluctuation of incidence does not occur amongst human beings. In 1927 to 1928, when attention became focussed upon the significance of undulant fever, there was a sudden striking rise in the incidence as recorded in Denmark.

III & IV. Experiences of the disease in Sweden and in Yugoslavia are discussed.

In the course of the general discussion, the danger of vaccinating cattle with virulent cultures of *Br. abortus* was emphasized, and the possibility of an infected human being transmitting the disease to healthy cattle was noted.—E. J. Pullinger.

Thompson, R. (1934). **The Etiology of Undulant Fever in Canada : *Brucella abortus* Isolated from Two Cases in Quebec.**—*Canad. med. Ass. J.* **30.** 485-487. 2 charts. [17 refs.]

—. (1934). **Brucella abortus and Undulant Fever in Man.**—*Ibid.* 540-541. [10 refs.]

The author discusses the cases of undulant fever recently reported in Canada, giving consideration to the estimated incidence of *Br. abortus* infection in cattle in Canada.

He is of the opinion that the cases reported in Canada are due to infection with *Br. abortus* and describes two cases, from the blood of one of which a culture was isolated.—Norman Bisset.

Veloppé, & Jaubert. (1935). Fromages frais et fièvre ondulante. [**Cheese and Undulant Fever**].—*Rev. gén. Méd. vét.* **44.** 513-523. 2 tables. [13 refs.] [An abridged version appears in *Rev. Microbiol., Paris.* **1.** 533-536].

This article gives the result of the medical and veterinary enquiries into an outbreak of undulant fever in which 17 persons were attacked. In 14 cases the infective medium appeared definitely to be fresh cheese (" la brousse " variety). Two persons died. All 14 persons bought their cheese from a merchant who

possessed 112 sheep and six goats. All the animals on the farm were tested and all the goats and all except four of the sheep reacted. There were two dogs on the farm and both reacted. A horse and a donkey did not react, neither did 12 fowls.

The enquiry revealed that it is a common practice for farmers who do not produce sufficient sheep's milk to make cheese to sell their milk to merchants who mix it with cows' milk. To safeguard the public from infection, the authors recommend that the heating of all milk which is to be used for cheese as well as that sold for direct consumption, if obtained from infected flocks, should be under supervision ; they realize, however, that this is impracticable but are of the opinion that the cheese would be safe for consumption if allowed to mature for at least a month.—G. Dods Munro.

Veazie, L., & Meyer, K. F. (1935). **Heparin as an Anticoagulant in the Brucella Phagocytic Index Test.**—*Proc. Soc. exp. Biol., N.Y.* **32.** 1616-1619. 1 table. [2 refs.]

A previous publication [this *Bull.* **6.** 111.] showed the value of this test in detecting brucella infection in man. When it was applied to the blood of infected goats and cattle only a low index was obtained unless a complicated technique was followed. The authors concluded that the citrate solution had a toxic effect on the granulocytes and experimented with other anticoagulants. Of these, heparin was the most effective. Using citrate, the average index of a group of infected cows was 1·6, while with heparin it was 13·6. In infected human beings the difference was not so marked, being 5·8 against 4·3 for citrate. A number of factors may cause a variation and a negative result should be accepted only after several tests.—A. W. Taylor.

Smith, Dorothea E., & Joffe, Eleanore W. (1934). **Variations in the Electrophoretic Mobilities of the Brucella Groups.**—*J. Bact.* **28.** 127-131. 1 table. [8 refs.]

A number of laboratory strains of bovine, caprine and porcine brucella organisms have been examined for electrophoretic mobility, with the object of obtaining a further means of differentiation. No definite relationship could be established between strain and the electro-kinetic potential difference ($\zeta$ potential) existent on the bacterial surface. This may have been due to the mixed rough and smooth nature of the cultures examined, and dissociated strains may give better results.—Norman Hole.

Mason, J. H. (1935). **The Lethal Dose of the Toxins of Some Anaerobes for Sheep.**—*Onderstepoort J. vet. Sci.* **5.** 61-64. 4 tables. [4 refs.]

As all the anaerobes pathogenic for sheep, except *Clostridium chauvoei*, produce toxins, an attempt was made to determine the lethal doses of these toxins for the ovine. The mouse : kg. body weight sheep ratio was found to be as follows :– *Cl. septique*, 1 : 17·5 ; *Cl. welchii* Type B, 1 : 60 ; *Cl. welchii*, Type D, 1 : 12·5, and *Cl. oedematiens*, 1 : 100.—E. M. Robinson.

I. Stewart, W. L. (1935). **Prophylaxis in Lamb Dysentery.**—*Vet. Rec.* **15.** 1508-1510. 1 table. [3 refs.]

II. —. (1935). **Anaerobic Diseases of Sheep.**—*Ibid.* 1517-1518.

I. In recent years there has been evidence to suggest that the routine method of applying vaccine and serum as prophylactics against lamb dysentery has failed on certain farms. Further field experiments to retest the value of specific prophy-

laxis had appeared essential, and in this article the author records the results obtained during the 1935 lambing season. Seventeen farms, arranged in four groups, were selected and tests were carried out to ascertain whether a combination of vaccination of the ewes and serum inoculation of the lambs would result in specific protection. Heterologous and homologous antitoxins were used. Of 4,892 lambs born on farms where the ewes had been vaccinated and the lambs had received serum, 18 lambs died of dysentery, representing a mortality rate of 0·36 per cent. Of 2,367 uninoculated lambs from unvaccinated ewes, 169 died of dysentery, representing a mortality rate of 7·14 per cent. There was no evidence of the failure of specific protection.

II. Attention is drawn to the importance of diseases of sheep caused by anaerobic micro-organisms and the necessity for their immediate further study. Mention is made of the scheme which has been drawn up by a committee appointed by the Agricultural Research Council. To facilitate the investigation, the co-operation of the sheep farmers, veterinary practitioners, veterinary investigation officers and research institutes is necessary.—D. R. WILSON.

ERIKSON, Dagny. (1935). **The Pathogenic Aerobic Organisms of the Actinomyces Group.**—*Spec. Rep. Ser. med. Res. Counc., Lond.* No. 203. pp. 61+xii. 100 figs. [Numerous refs.] London: H. M. Stat. Off. [8vo] [1s.]

In the introduction to this publication the author states :–

"The National Collection of Type Cultures maintained by the Medical Research Council at the Lister Institute has in the course of years received a variety of organisms commonly classed as Ray-Fungi, but designated *Actinomyces*, *Streptothrix* or *Nocardia* according to the descriptions of the various donors. Many of these have been isolated from human or animal lesions, either from cases of actinomycosis of the body – with or without the characteristic 'grains' and 'club formation' – or of mycetoma of the limbs. In addition to these, a considerable number of strains were recently presented to the collection by Dr. A. G. Gibson, Radcliffe Infirmary, Oxford, which were isolated by him from human spleens and blood culture in cases of acholuric jaundice, splenic anaemia and Banti's disease and from the tissues of inoculated monkeys (*Macacus sinicus*). In view of the vexed taxonomic status of the group and in the hope of contributing something towards its elucidation, it was considered desirable to make an attempt to describe and classify these strains."

This publication is the result of this study.

ØRSKOV's morphological classification has been adopted by the author as this appeared to her to be the most practical and natural scheme yet published, but she has not adopted ØRSKOV's proposed generic names.

Twenty-five species of pathogenic aerobic actinomycetes have been classified in this way, and each of the species is described in cultural and morphological detail. The morphological details referred to in the text are illustrated by 22 pages of diagrams.

[The bulk of this publication, which consists of descriptions of individual species, does not lend itself to abstraction and should be consulted in the original by all interested in this subject].—GWILYM O. DAVIES.

KRISHNAMURTHY, V. N. (1935). Das Schicksal der Bakterien auf den oberen Luftwegen immunisierter Tiere. [**The Fate of Bacteria in the Upper Respiratory Tract of Immunized Animals**].—*Arch. Hyg., Berl.* **114.** 121-136. 4 figs. on 1 plate, 1 table. [8 refs.]

The author studied the fate of bacteria instilled into the respiratory tract of susceptible and non-susceptible mice and guinea pigs. Usually organisms such as anthrax bacilli or pneumococci were introduced into the trachea. Animals so treated were subsequently killed and material from the trachea was taken for section. In the susceptible animal the parasite rapidly invaded the mucosa and

became established there or invaded more extensively according to its nature. In the immune animal a minimum of invasion occurred, organisms being phagocyted by leucocytes and mononuclear cells in the lumen, also by the epithelial cells. Furthermore they were injured by the body fluids and were agglutinated in clumps. All debris was removed by the ciliated epithelium.—E. J. PULLINGER.

LAGRANGE, E., & LAGRANGE, M. T. (1935). Sur la diversité d'action de la lanoline et du tapioca sur quelques germes pathogènes. [**The Action of Lanoline and Tapioca on Pathogenic Bacteria**].—*C. R. Soc. Biol. Paris.* **120.** 390-391. [3 refs.]

The authors tested the effect of adding lanoline and tapioca to suspensions of different bacteria and administration, by subcutaneous injection, into various laboratory animals. In some cases the virulence of the bacteria was increased, *e.g.* in tests with staphylococci and *Bacillus anthracis*. No effect was observed with *Corynebact. pseudotuberculosis ovis* (guinea pig), *Pasteurella aviseptica* (mouse) or *Erysipelothrix rhusiopathiae* (pigeon). Virulence was reduced for *B. subtilis* and *Mycobact. tuberculosis*. The virus of fowl plague treated in this way produced no disease when massive first doses were given to pullets, but caused death in 36 hours when a second injection was made eight days later. Neither physical nor chemical reasons for the variation in action were found.—C. V. WATKINS.

COOPER, Evelyn A., & PRESTON, J. F. (1935). **Enzyme Formation and Polysaccharide Synthesis by Bacteria.**—*Bio-chem. J.* **29.** 2267-2277. [18 refs.]

The recent isolation in a pure state of the polysaccharides formed by the activity of the micro-organisms *Bacillus mesentericus*, *B. subtilis* and *Acetobacter xylinum* has focussed much attention on the problem of polysaccharide formation by bacteria and its future importance in the study of various immunological phenomena. The experimental work described in the present paper deals mainly with the problem of enzyme formation and polysaccharide synthesis by (1) bacteria related to *B. mesentericus*, and (2) bacteria pathogenic to plants. It was established that mannose and arabinose inhibited the formation of polyssacharides from sucrose by *B. mesentericus* and *B. megatherium* and that this was due to a direct toxic effect on the cell and not to interference with enzyme mechanism. Glycerol, mannitol and sorbitol diminished the diastatic power of cultures of *B. megatherium*, and this inhibitory effect appeared to be due to a depression in the rate of formation of the diastatic enzyme in the bacterial cell though the action of invertase was unaffected. *B. megatherium* and *A. xylinum* did not synthesize polysaccharides from fatty acids. Polysaccharide formation was obtained from sucrose in the presence of asparagine, d-alanine and l-leucine as sole sources of nitrogen so that the concept that peptone is essential was found to be wrong.

Similar work with plant pathogens is also described, as well as the chemical nature of the various polysaccharides obtained and the methods for large-scale preparation of the polysaccharides synthesized by some of the plant pathogens.
—JAMES STEWART.

BRANCHINI, B. (1935). Di una rara forma di dermatomicosi nel cane. [**A Rare Form of Dermatomycosis in Dogs (Achorion Infection)**].—*Atti Ist. bot. Univ. Pavia.* **6.** 1-53. 23 figs. [Numerous refs.] [English and Latin summaries : abst. from orig.]

A detailed examination of a three-year-old pointer which was suffering from follicular mange led to the discovery that it was also affected with *Achorion caninum*. The lesions had been present for about a month when the first examina-

tion was made and were mainly confined to the head, neck, thorax, right flank and abdomen. The disease was accompanied by intense pruritus, the mucous membranes were pale and papillomata were present on the lips and cheeks but in other respects the animal appeared normal. The first sign of the condition was a raising of the hairs in circular patches at the base of which a thick yellowy exudate collected. This formed a crust which could be easily removed and under it the skin was moist. In the natural course of the disease, the serous exudates under the crust eventually pushed off the latter, leaving areas of raw skin denuded of hairs. Various treatments were given over a period of six months but without success, and the animal was destroyed.

The presence of *Achorion caninum* was demonstrated by the microscopic examination of hairs which had been treated with 20 per cent. potassium hydroxide ; cultivation was possible on Pollacci's medium. After a week's growth on this medium, subcultures were made on simple agar, glycerin-potato and other media, and in each case growth was abundant after 24 to 48 hours at 26°C. On agar small, rose-red colonies developed and the fungus appeared as intricate mycelial filaments, simple or branching, which showed terminal spores. The fungus was killed after 30 minutes at 40°C., after prolonged desiccation and by corrosive sublimate, carbolic acid, tincture of iodine and salicylic acid. It only grew aerobically. Transmission experiments were not very successful and its pathogenicity was only demonstrated in dogs and rabbits which were already suffering from a dermatitis, *e.g.* sarcoptic mange. The fungus does not possess very active allergic properties.—J. A. NICHOLSON.

## DISEASES CAUSED BY PROTOZOAN PARASITES.

KLIGLER, I. J., & BERMAN, M. (1935). **Susceptibility and Resistance to a Trypanosome Infection. X. Specific Character of the Immunity Produced in Rats by the Injection of Suspensions of Dead Trypanosomes.**—*Ann. trop. Med. Parasit.* **29.** 457-461. 3 tables. [1 ref.]

This article records experiments carried out on the value of the immunity conferred on rats, by the inoculation of suspensions of dead trypanosomes, against homologous and heterologous strains of the organisms. Rats were injected with suspensions of *Tryp. evansi*, *T. gambiense* and *T. equi* obtained by fractional centrifugalization of blood, and killed by incubating for two hours at 37°C. and then leaving in an ice box until the trypanosomes were dead. An immunity, evidenced by a prolongation of the duration of the infection, was produced against homologous species, but not against the heterologous species except in one instance in which *T. evansi* injections appeared to give some protection against *T. gambiense*.

—U. F. RICHARDSON.

RINALDI, L. (1933). Di una tripanosi dei dromedari riscontrata in Tripolitania (Misurata). [**Trypanosomiasis of the Camel at Misurata, Tripoli**].—*Arch. ital. Sci. med. colon.* **14.** 141-143. [English, French and German summaries: abst. from orig.]

An outbreak of trypanosomiasis in camels due to a polymorphic trypanosome is recorded in Tripoli. The camels became emaciated and, *post mortem*, one exhibited areas of red hepatization in the lungs, in which trypanosomes were present in large numbers. Rabbits were infected by inoculation, and both the long and short forms of the trypanosome appeared in their blood. Infected rabbits exhibited conjunctivitis and emaciation but recovered condition in about a month.

It is suggested that the trypanosome is identical with that reported by FRANCHINI from Cirenaica, and believed to be a variety of *Tryp. evansi.*

A microfilaria was also encountered in smears from the lungs, and was considered to be probably identical with the *Microfilaria cameli* of FRANCHINI. —U. F. RICHARDSON.

ADAMS, A. R. D. (1935). **Trypanosomiasis of Stock in Mauritius. II. Observations on the Incidence and Distribution of Trypanosomiasis in Cattle.**—*Ann. trop. Med. Parasit.* **29.** 475-481. 1 table, 1 map. [4 refs.] [For abst. of previous article, see this *Bull.* **5.** 704].

The examination of single thin blood smears taken at random from local cattle in Mauritius in 1934 revealed an infection rate with *Tryp. vivax* of 0·72 per cent. and with *T. evansi* of 0·46 per cent. More careful examination in 1935 revealed an infection rate with *T. vivax* of 2·03 per cent. and with *T. evansi* of 0·74 per cent. It is pointed out that the examination of a single film will not reveal all *T. vivax* infections, as the blood is often free from trypanosomes for as long as a month at a time. It has also been found that, during this negative phase, subinoculation of blood may give negative results. The distribution of the *T. vivax* infection indicated that parts of the island might be free from the disease, but it is pointed out that these areas were inaccessible and not often visited by the veterinary staff whilst, as *T. vivax* infection does not produce severe disease, it would not attract the attention of the owner.

*T. theileri*, *Theileria mutans*, *Babesia bigemina* and *Sarcocystis meischeriana* were also encountered in the smears.—U. F. RICHARDSON.

PACKCHANIAN, A. (1935). **A Method of Maintaining Laboratory Strains of Trypanosoma brucei in a Subspecies of Peromyscus maniculatus.**—*J. Lab. clin. Med.* **20.** 510-515. 2 charts, 1 table. [11 refs.]

As the result of several hundred inoculations extending over three years, the author concludes that *P. maniculatus* (American deer mouse) is a suitable animal in which to maintain strains of *T. brucei* or *T. evansi*, as this species of mouse will support the trypanosome infections for an average period of 80 days, as compared with a period of five to 15 days in the case of rats and the ordinary house and laboratory mice. Maintenance of strains of trypanosomes in *P. maniculatus* did not reduce their virulence for other laboratory animals. Other species of *Peromyscus* proved just as susceptible to trypanosome infection as rats and mice.—U. F. R.

JACONO, I. (1935). Osservazioni sui tripanosomi e proposta di una nuova classifica. [**Studies on Trypanosomes and a Proposal for a New Classification**].—*Ann. Med. nav. colon.* **41.** 1-18. 20 figs., 1 table. [6 refs.]

Observations are recorded on *Tryp. rotatorium* of the frog, which is described as passing through a trophozoite stage – during which it exhibits active motility, a well-developed undulating membrane and a kinetoplast situated near the posterior extremity – to an adult stage, in which the parasite becomes ovoid and non-motile. In this adult stage, the protoplasm is striated and no vacuole is present ; the nucleus is indistinct and the kinetoplast lies immediately behind the nucleus ; the flagellum is much shorter than that of the trophozoite and the undulating membrane is much reduced. Multiplication takes place at this stage by a division of the nucleus, the formation of a second kinetoplast and the division of the parasite into two.

The author argues that the adult form is morphologically distinct from the trypanosomes which are pathogenic to man and animals, and that these also fail

to exhibit the form of development described. He therefore proposes that the genus (*Trypanosoma*, Gruby 1843) should be limited to those flagellates of the family Trypanosomidae in which the adult form consists of ovular or globular elements with a fibrillar structure of the protoplasm, a relatively small nucleus, a kinetoplast in the immediate neighbourhood of the nucleus, but devoid of a vacuole.

Those species in which the adult form is elongated, with granular or homogeneous protoplasm, a distinct vacuole, a relatively large nucleus, and a kinetoplast situated towards the posterior extremity, he proposes to place in the genus *Castellanella*, Chalmers 1918.—U. F. Richardson.

Rajčević, M., & Okljesa, B. (1936). Trihomonijaza, zaraza govedih genitalnih organa u Jugoslaviji. [**Genital Trichomonad Infection in Cattle**].—*Vet. Arhiv.* **6.** 1-30. 2 figs. [Numerous refs.] [Abst. from German summary].

This is the first time that trichomonad infection has been reported in Yugoslavia. Of 144 cows examined for sterility, eight were suffering from trichomonad infection. Another case was seen in a cow killed at an abattoir and one was also reported by a veterinarian. The symptoms of the eight cows were abortion during the first month of pregnancy, pyometra and endometritis. The trichomonads were 12·5 to 20$\mu$ long and from 3·75 to 10$\mu$ wide. They could survive outside the host for 28 days. A cow in the fifth month of pregnancy was found to be infected, but abortion did not occur.

—. (1934). **East Coast Fever. Turning Sickness.**—*Rep. vet. Dep. Uganda, 1933.* pp. 40-43.

A study of the morphology of the *Theileria* causing " amakebe " [believed to be a form of East Coast fever in calves] in Uganda revealed that the tailed form of the parasite predominates, in contrast to *Th. dispar* infections in which the ring forms are the most prevalent. Moreover, the Uganda ring forms tend to be oval and are rarely as round as forms of *Th. dispar*. The anaemia associated with *Th. dispar* is generally absent and, when present, appears to be due to a superimposed protozoan disease, such as anaplasmosis.

In calves in Uganda, particularly those animals which subsequently pass through a mild attack, Koch's bodies can be detected two to three days before the initial rise of temperature.

An investigation as to the distribution of schizonts in the carcass at death revealed that they were most numerous in the spleen and lymphatic systems and less frequent in the liver ; in three animals they could be readily detected in the circulating lymphocytes but, in contrast to " turning sickness ", they could not be detected in brain smears.

The most constant lesions, other than those involving the lymphatic system, are oedema of the lungs, and congestion and ulceration of the abomasum. Kidney infarcts could not be detected in the 21 animals under investigation, whilst the brains of 18 animals were subjected to careful examination without the detection of haemorrhages.

It is considered that " enlarged, hyperaemic, lymphatic glands coupled with pulmonary oedema and congestion, and abnormal ulceration, allow of a positive diagnosis of east coast fever."

Treatment was attempted unsuccessfully with " antimosan " and " aciron ".

In every case of " turning sickness " that has been examined, bodies morphologically identical with Koch's blue bodies have been found in smears from the brain and, with one exception, such bodies have been confined to the brain.

The brain may be teaming with agamonts and gametes, yet in most animals parasites are extremely rare in, or apparently absent from, the red corpuscles.

The majority of cases of "turning sickness" occurred in adult animals which were definitely known to have recovered from East Coast fever.—U. F. RICHARDSON.

YAKIMOFF, W. L., & LOMAKIN, D. P. (1935). Ueber den ersten Fall von Pferdenuttalliose in fernen Osten. [**The First Case of Equine Infection with** *Babesia equi* **in the Far East of Siberia**].—*Tierärztl. Rdsch.* **41.** 805-806.

The authors record the discovery of *B. equi* in smears from a horse from Birobidschan. The horse had been imported from European Russia six to seven months previously so that the infection was considered to have been acquired locally. The majority of the parasites were of the large round forms. Small forms, pear-shaped organisms and maltese cross forms were all rare.—U. F. R.

KNOWLES, R. (1935). **Monkey Malaria.** [**Correspondence**].—*Brit. med. J.* Nov. 23rd. 1020.

This letter draws attention to the fact that it was CAMPBELL and NAPIER [(1932). *Indian med. Gaz.* **67.** 246.] who first observed that the plasmodium which exists as a harmless commensal in the blood of the monkey, *Silenus irus*, produces virulent infections when injected into monkeys of the species *S. rhesus*. This observation has had an important bearing on the malarial problem.—U. F. R.

## DISEASES CAUSED BY VIRUSES.

CURASSON, G. (1935). Un nouveau vaccin contre la peste bovine : le virus saponiné. (Note préliminaire). [**A Preliminary Note on a New Saponinized Vaccine against Rinderpest**].—*Bull. Acad. vét. Fr.* **8.** 250-253.

This note records experiments on the value of saponin-rinderpest virus mixtures as vaccines. A 2 per cent. solution of saponin, allowed to act on virulent rinderpest blood for less than ten minutes immediately before injection into susceptible animals prevented any reaction or the production of immunity, but a vaccine prepared by the action of saponin on spleen pulp provoked a febrile reaction and conferred sufficient immunity to protect against virulent blood inoculated 12 days later. Animals reacting to this vaccination exhibited no symptoms but, in view of the marked temperature reaction, it is thought that the immunity produced will prove to be active and, as only 2 c.c. of spleen pulp is required to vaccinate each animal, this vaccine is more economical than the ordinary formol vaccine. Some difficulty was encountered in producing the vaccine aseptically, but an attempt at sterilization by the addition of " chinosol " led to a loss of the immunizing property.

—U. F. RICHARDSON.

TOPACIO, T. (1935). **Glycerinated Rinderpest Vaccine stored at Room Temperature.**—*Philipp. J. Sci.* **57.** 427-433. 1 table. [11 refs.]

The author records that trials of numerous varieties of rinderpest vaccine prepared by various workers in different countries showed that, with the possible exception of a vaccine prepared by EVANS [(1928). *Rep. Dep. vet. Sci. Tanganyika.* p. 14.], they did not prove satisfactory when kept at room temperature and that, therefore, when mass vaccination was most urgently needed it was difficult to provide the necessary quantity of vaccine at the desired moment. He describes the production of a vaccine by treating triturated pulp of the spleen and lymph glands with varying quantities of 50 per cent. glycerin-saline and, after keeping for 24 hours in cold storage, straining the mixture and adding formalin to a dilution

of 1 : 1,000. The most satisfactory results were obtained with vaccines in which the proportion of pulp to glycerin-saline was 1 : 3. It is claimed that the vaccine is ready for use in three days and will keep at room temperature for three months. Out of 14 animals vaccinated with material over one month old, followed by an injection of virus 14 days later, four animals developed symptoms of rinderpest.—U. F. Richardson.

Srikantaiah, G. N. (1935). **Preventive Measures against Rinderpest in Mysore.** —*Indian vet. J.* **12.** 113-126. 5 charts, 2 maps. [20 refs.]

The problem of the control of rinderpest in Mysore is considered to be dependent upon a satisfactory method of immunization, since the sentiment of the owners is opposed to methods of eradication based on the slaughter of affected animals. The spread of the disease in Mysore appears to have been largely due to the exposure of affected animals for sale at fairs, with the resultant infection of other cattle and sheep at the same fair. The author considers that ticks and biting flies may be of considerable importance in the spread of rinderpest and suggests that the persistence of the disease in certain naturally isolated areas may be due to the spread of infection by Tabanidae. Regulations have been introduced in Mysore providing for the notification of outbreaks of disease, the prohibition of movement from infected areas, the burial of carcasses of affected animals and the prohibition of fairs on the recommendation of the officers of the veterinary department. To provide immunity to cattle in infected areas, the serum-alone method of inoculation was used up to 1925, when it was discarded in favour of the serum-simultaneous method. In 1934 the goat virus method was introduced, but the use of serum and cattle virus is still recommended for the immunization of buffaloes. Experiments indicated that young calves immunized by the serum-simultaneous method might lose their immunity within a year, that the goat virus could be kept at room temperature for ten days without losing its value, and that the goat virus might be non-infective at doses under 0·1 c.c.—U. F. Richardson.

Traum, J. (1934). **Foot and Mouth Disease : Differential Diagnosis.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2907-2910. [22 refs.]

The only known disease likely to cause any difficulty to an experienced observer is vesicular stomatitis and, in cattle and pigs, the similarity of the lesions of vesicular stomatitis and foot and mouth disease often makes it difficult to give a definite diagnosis. Where the nature of the disease is doubtful, cattle, pigs, guinea pigs and horses can be inoculated. The development of typical lesions in all but the horse enables a diagnosis of foot and mouth disease to be made. In some cases this method fails owing to certain strains of foot and mouth disease virus which have become adapted to one species failing to infect other species.

Attempts to confirm the claims of Ciuca for the complement-fixation test have not been very successful, and this test cannot as yet be regarded as a dependable diagnostic method.

Theoretically, the most accurate diagnosis should be possible by means of one or more immunity tests. Groups of guinea pigs actively immunized against the three foot and mouth disease and two vesicular stomatitis viruses can be injected with suspected material, or the guinea pigs can be passively immunized with the various immune sera either simultaneously with, or immediately before, the injection of the suspected virus. Horses can also be used. In the case of adapted strains, similar passive immunity tests can be made on the particular susceptible species. [See, however, this *Bull.* **4.** 666. for a description of a new disease of swine in California resembling foot and mouth disease].—Gwilym O. Davies.

Toussieng, E. (1935). Dyrkningsforsøg med mund- og klovesygevirus paa hjernevaev af marsvinefostre. **[Culture of Foot and Mouth Disease Virus on Embryonic Guinea Pig Brain].**—*Maanedsskr. Dyrlaeg.* **47.** 305-315. 5 tables. [1 ref.] [German summary : abst. from orig.]

This investigation was carried out during a study course at the virus research institute, Riems, and constitutes a link in the chain of endeavours to ascertain whether it is possible to modify the virus of foot and mouth disease to a neurotropic one. Cultures grew well in brain tissue, but the concentrations of virus attained were much lower than in corresponding cultures in epithelial tissue. Intracerebral inoculations of brain culture passages into guinea pigs failed to yield evidence of special affinity to brain tissue.—H. C. Bendixen (Copenhagen).

Galloway, I. A., & Elford, W. J. (1935). **Further Studies on the Differentiation of the Virus of Vesicular Stomatitis from that of Foot-and-Mouth Disease, with Particular Reference to a Rapid and Certain Method of Resolving Mixtures of the Two Viruses.**—*Brit. J. exp. Path.* **16.** 588-613. 13 tables, 3 charts. [11 refs.]

Serial cultivation of vesicular stomatitis virus in the chorio-allantoic membrane of developing hens' eggs causes slight diminution in size, or alteration of surface properties of the virus, resulting in easier filtration through collodion membranes ; this change is not readily reversible by subsequent guinea pig passage. Egg inoculation is more sensitive than is guinea pig passage in detecting virus. In similar circumstances the eight-times smaller virus of foot and mouth disease does not even survive. Mixtures of the two viruses in any proportions can therefore be resolved by combining filtration with egg inoculation. Both viruses may be successfully passaged together in a guinea pig, and then separated by this method.

At 0°C. the virus of foot and mouth disease is fairly stable at pH 2·5 to 3·5, and more so at pH 6·5 to 10, but is rapidly inactivated at pH 4·5 to 6·2. The virus of vesicular stomatitis is not stable on the acid side of pH 4·5. In spite of accurate control of details a differentiation of the two viruses based on these findings, or on Pyl's " realkalinisation " test, is not reliable. The original article should be consulted for details of application of these facts.—E. Weston Hurst.

Ishii, S., Watanabe, S., & Miura, Y. (1935). **Haemacytological Changes in Hog Cholera. I. Observations on the " Substantia Granulo-Filamentosa " in Red Blood Cell – Reticulocytes.**—*J. Jap. Soc. vet. Sci.* **14.** 39-52. 2 figs. on 1 plate, 25 tables. [12 refs.] [In English : Japanese summary].

The authors describe a vital staining substance in a small proportion of red blood corpuscles in porcine blood. They call it " substantia granulo-filamentosa" and refer to affected cells as " reticulocytes " which form 0·24 per cent. of the red blood corpuscles in animals between the ages of three and 20 months. These " reticulocytes " disappear from the blood in swine fever, but increase in the blood in swine plague and swine erysipelas.—J. E.

Buzna, D. (1934). Elofordulnak-e a sertéspestisnél sejtzárványok ? **[Do Cell Inclusions occur in Swine Fever ?]**—*Allatorv. Lapok.* **57.** 127-129. [4 refs.]

Inclusion bodies in epithelial cells of the conjunctiva in swine fever were first observed by Uhlenhuth and his collaborators, and later by Himmelberger. These results, however, have so far not been confirmed. The author therefore examined the conjunctival epithelium of 66 pigs, some infected artificially and some naturally with swine fever. No bodies resembling those described by the above authors were detected in the course of prolonged examinations. Buzna concludes

that nuclear detritus may possibly have been mistaken for cell inclusions by these workers.—A. KOTLÁN (BUDAPEST).

NEITZ, W. O. (1935). **The Blesbuck** (*Damaliscus albifrons*) **and the Black Wildebeest** (*Conochaetes Gnu*) **as Carriers of Heartwater.**—*Onderstepoort J. vet. Sci.* **5.** 35-40. 4 tables. [4 refs.]

The blood of the blesbuck and black wildebeest did not contain any virus of the heartwater type as demonstrated by the inoculation of sheep. Heartwater could be transmitted to these animals, but no symptoms were shown except in a blesbuck which had been previously splenectomized. The blood of these animals was infective for sheep, but only for periods varying from 12 to 30 days after inoculation. These species must be regarded as possible reservoirs of the disease in heartwater areas.—E. M. ROBINSON.

I. CARRÉ, H., & VERGE, J. (1935). Les anémies infectieuses des animaux domestiques. [**Infectious Anaemia of Domestic Animals**].—*Bull. Off. internat. Epiz.* **10.** 87-150. Discussion pp. 422-439. 2 figs., 8 charts. [9 refs.]

II. ZWICK, W. (1935). Les anémies infectieuses et particulièrement l'anémie infectieuse des chevaux. [**Infectious Anaemia of Sheep and Horses**].—*Ibid.* 151-198. Discussion pp. 422-439. 1 table, 1 chart.

III. —. (1935). Anémies infectieuses en Yougoslavie. [**Equine Infectious Anaemias in Yugoslavia**].—*Ibid.* 341.

I. This paper opens with a list of the main characteristics of the infectious animal anaemias of virus origin of which the following have been recognized to date :– infectious anaemia of sheep and goats [DONATIEN & LESTOQUARD (1924). *C. R. Acad. Sci., Paris.* **178.** 203.] ; infectious anaemia of the dog [TRINCAS, (1906). *Boll. Soc. Sci. med. nat. Cagliari.* **4.**] ; infectious anaemia of bovines [IMMINGER (1886). *Wschr. Tierheilk. Vieh.* **30.** 137.], and equine infectious anaemia. The paper then passes to a consideration of each of these diseases in turn.

Infectious anaemia of sheep and goats is defined, its geographic distribution given and a typical case of the disease described. There is an account of some passage experiments. Symptoms, lesions, aetiology, diagnosis, methods of infection, immunity and prophylaxis are then dealt with. There is a comparative note on the disease in horses and that in sheep and goats. The monkey, *Macacus inuus*, is found to be susceptible to the ovine virus but not to the equine.

Infectious anaemia of the dog is only briefly considered. A virus origin for the condition has been proved and it is distinct from that of dog distemper.

The available information in regard to bovine infectious anaemia is then briefly reviewed.

The remainder of the paper, more than four-fifths of the whole, is devoted to equine infectious anaemia. This, however, is a reprint of Verge's original article on the subject, a lengthy abstract of which has already been furnished [see this *Bull.* **5.** 555].

Certain alterations and additions to the original have been made to bring the article up to date, of which the following are among the more important :– (1) references to GUILHON's work on the demonstration of a haemosiderin in the liver of affected animals, to Sobra's guttadiaphot test, and to experiences obtained with Sarnowiec's technique : none of these have proved to be of any value in diagnosis ; (2) a note summarizing the results obtained with Fulton's test to the effect that, while possessing value where infection is known to exist, it should not

be employed as a single diagnostic measure to establish the existence of a new centre of infection ; (3) a reference to recent experiments showing the possibility of infection by way of skin abrasions and thereby the probable role of insect vectors in the spread of the disease ; (4) a note on the recent work of RAMON and LEMÉTAYER on the nature of the immunity possessed by clinically cured cases and a note on BALOZET's experiences with reinfection experiments, and (5) a chart demonstrating that " stovarsol " injections in no way influence the course of the disease in fatal cases.

The section devoted to immunization has been rewritten, all recent work of importance being summarized.

II. This paper is mainly a summary of the present state of knowledge of infectious anaemia of sheep, that of goats and equine infectious anaemia. The investigations of those most prominently engaged in the study of these diseases are reviewed. Only in certain places does the author advance his own opinions. Original material is therefore limited but, nevertheless, as a record of the latest developments in regard to these conditions, the paper is of considerable value.

The first part is devoted to a consideration of those conditions which have been diagnosed as infectious anaemia of sheep and goats. DONATIEN and LESTOQUARD's work in Algeria, LESTOQUARD and EKREM's studies in Turkey and GERLACH's communication, also from Turkey, are reviewed at length. A virus origin is held to be proved in all three. The first two are considered to be identical diseases. In the third instance the chief points of difference noted are special features of the blood picture and the absence of references to pneumonic lesions among the typical symptoms. The three records are compared. In Algeria, all breeds of sheep were found to be susceptible whereas in Turkey only merino or merino cross-breeds showed infection. In all cases, horses proved susceptible to the ovine virus, but sheep were not susceptible to the equine virus. In sheep, one attack conferred no immunity.

Equine infectious anaemia is considered at some length. An exhaustive record of the present geographic distribution is given. The disease spread in the countries of the belligerents in the war of 1914 to 1918. The author suggests that extensive mallein testing may account in part for this, the virus being transferred through the medium of infected syringe needles. In the United States of America, Sweden and Japan the disease appears to be one of pasturage whereas in France it is essentially a disease of the stabled animal.

Available information in regard to aetiology, resistance to infection, natural infection, symptoms, course, prognosis and anatomical lesions is thoroughly reviewed. Diagnosis receives special attention and the author emphasizes that in his opinion the inoculation of a known healthy horse remains the one and only reliable method of diagnosis available, and only then provided that a positive result is forthcoming. He includes in a special section a description of what he terms " carcass diagnosis ". In this connexion the indications offered by the naked-eye appearance and histological examination of the liver and spleen are of special importance. The final sections devoted to immunization, prophylaxis and veterinary-police measures are exhaustive and contain much useful information.

III. This is a short paragraph only, announcing the appearance of equine infectious anaemia in Yugoslavia in 1934, the first to be recorded in that country. No details are given.—C. DAVENPORT.

HJÄRRE, A. (1936). Die Leberveränderungen bei der infektiösen Anämie des Pferdes. [**Liver Changes in Equine Infectious Anaemia**].—*Münch. tierärztl. Wschr.* **87.** 26-31. 4 figs. [Numerous refs.]

This is a translation by E. Bass of a Swedish paper, for abstract of which see this *Bull.* **5.** 489.

Howitt, Beatrice F. (1935). **An Immunological Study in Laboratory Animals of Thirteen Different Strains of Equine Encephalomyelitic Virus.**—*J. Immunol.* **29.** 319-341. 4 tables. [21 refs.]

An abstract made from an abridged account of this work has already appeared [see this *Bull.* **6.** 128].

In this, the complete article, details of the method of immunizing the guinea pigs, of carrying out the various tests, together with the details of the results of these tests, are given. Details are also given of variations met with in the different strains.

Guinea pigs born of immune mothers were tested within a few days to several weeks after birth by intracerebral inoculation, first of homologous virus and, later, heterologous virus. They were all immune to the homologous virus. A smaller percentage of them were immune to heterologous strains than was the case in immunized adult guinea pigs when tested with heterologous strains.

It was found that the viruses lost much of their virulence if not frequently passaged. The three eastern strains were found to be more potent than the Russian, the Argentine and the western American strains.

The Russian virus was retained by a Leitz filter, but passed through a Berkefeld N, while the American strains passed through both.—A. Brownlee.

Merrill, M. H., & Ten Broeck, C. (1935). **The Transmission of Equine Encephalomyelitis Virus by Aëdes aegypti.**—*J. exp. Med.* **62.** 687-695. 6 tables. [4 refs.]

Using the western strain, the authors confirmed Kelser's statement [this *Bull.* **4.** 107.] that *A. aegypti* can transmit the virus of equine encephalomyelitis from infected to healthy guinea pigs. Mosquitoes transmit the disease by biting during a period lasting from four days to two months after being fed either on infected guinea pigs or on highly infective tissue. Mosquitoes remain infective all their life, but do not appear to transmit infection through their eggs or to each other.

The authors were unable to demonstrate mosquito transmission with the eastern virus. The eastern virus is apparently incapable of penetrating the intestinal mucosa of the mosquito. If, however, the abdominal cavities of such mosquitoes are pierced with a small needle moistened in virus suspensions, transmission experiments are positive.—Gwilym O. Davies.

Hindersson, R. (1936). Die Bedeutung der Schutzimpfung im Kampfe gegen die Tollwut. [**The Control of Rabies in Finland**].—*Münch. tierärztl. Wschr.* **87.** 37-43. 1 table, 4 maps. [Numerous refs.]

This is a translation of a paper read at the Veterinary Congress held at Helsingfors in 1933 [see this *Bull.* **4.** 658].

Lépine, P. (1935). Action comparée de l'immersion en glycérine et de la congélation sur la conservation de la virulence des moelles rabiques. [**The Comparative Action of Immersion in Glycerin and Refrigeration on the Preservation of the Virulence of Rabies Virus in Spinal Cord**].—*C. R. Acad. Sci., Paris.* **201.** 172-174. [3 refs.]

The spinal cord of a rabid rabbit was divided into two, one part being kept in

glycerin at 3°C. and the other part in a refrigerator at a temperature between –9° and –11°C. In the first case the infectivity was lost between the 14th and 30th days, whilst in the other case it was maintained for the whole period of observation (70 days). The author considers that the attenuation of the rabies virus which occurs when it is maintained in a laboratory is due to immersion in glycerin rather than to repeated passage through one species of animal.—U. F. Richardson.

Remlinger, P., & Bailly, J. (1935). La décentralisation de la vaccination antirabique. [**The Decentralization of Antirabic Vaccination**].—*Bull. Acad. Méd. Paris.* **113.** 579-583.

The authors suggest that it is now quite unnecessary to confine the application of antirabic vaccination to recognized centres. In Tangier, a killed vaccine is used extensively by veterinarians on all species of animals. It is composed of a phenolized suspension which is tested for inocuity on rabbits and which retains its efficacy for at least three months. The duration of treatment of animals exposed to infection lasts from 15 to 25 days according to the severity of the bite.

—R. E. Glover.

Nicolau, S., & Baffet, O. (1935). La coloration de Lépine dans la recherche des corps de Negri. [**Lépine's Strain for Negri Bodies**].—*C. R. Soc. Biol. Paris.* **120.** 319-322. 4 tables. [4 refs.]

Some strains of rabies virus produce basophile inclusion bodies in the neurons. For these, Mann's method is unsatisfactory and Giemsa's stain is generally employed to demonstrate them.

An African strain of rabies virus was found to produce such bodies, and comparisons were made between the effectiveness of staining by Giemsa's slow method and Lépine's stain. Comparable counts on the number of bodies stained by the two methods in a given number of neurons were made, and it was found that Lépine's method demonstrated 2·4 to 5·74 times more bodies than did Giemsa's slow method. [Details of the method described by Lépine are given in this *Bull.* **6.** 277].—A. Brownlee.

Frauchiger, E., & Walthard, K. M. (1935). Zur Histopathologie der nervösen Staupe. [**The Histopathology of Nervous Distemper**].—*Arch. wiss. prakt. Tierheilk.* **69.** 231-249. 3 figs. [Numerous refs.]

In nervous distemper there are always more or less rhythmic clonic-tonic movements which are accompanied by, or end in, paresis of one or more of the extremities. In chorea, although the movements are also involuntary, they are not rhythmic but irregular, rapid and meaningless. Inflammatory changes in the brain are found in both conditions. The histological picture of the seven cases of true nervous distemper here discussed was found to be very complicated. There was no apparent connexion between the clinical symptoms and the pathological findings. The more important changes were an inflammatory infiltration of the brain and spinal cord, glial proliferation, degenerative changes in the ganglion cells but not the nerve fibres, perivascular infiltration in the white and grey matter of the brain and hyperaemia and inflammatory infiltration of the meninges. Inclusion bodies were never seen. From the histological findings, cases of nervous distemper fall into three groups :– those in which there is a generalized hyperaemia of the brain and spinal cord ; those in which there is glial proliferation and incomplete necrosis of the ganglion cells and in which the mesodermal vessels are only slightly involved, and those in which inflammatory changes involve the whole of the central nervous system and the meninges.—J. A. Nicholson.

Pyle, N. J., & Brown, R. M. (1935). **The Evaluation of Canine Distemper Virus and Antiserum.**—*J. Amer. vet. med. Ass.* **87.** 522-530. 3 tables. [2 refs.]

The need for accurate standardization of both distemper virus and antiserum is obvious. Though the activity of canine distemper virus can be accurately estimated by titrating the virus on ferrets, the process is both costly and laborious.

The authors show that, as a result of six years' work, they found a close relation to exist between the activity of a particular batch of canine distemper virus and the incubation period after injection of that virus into ferrets. It was found possible to correlate the activity of the virus, as demonstrated by the course of the disease produced in ferrets and the antigenic value of the same virus, as shown by the complement-fixation test. The authors conclude that in the complement-fixation test there is a satisfactory means of estimating the potency of distemper virus. They also show that complement fixation provides a means of standardizing antidistemper serum.—G. F. Boddie.

Urbain, A. (1935). Sur l'étiologie du typhus des carnassiers de ménagerie. **[Gastro-Enteritis of Carnivorous Animals in Zoological Gardens caused by a Filtrable Virus].**—*C. R. Soc. Biol. Paris.* **120.** 836-839. [6 refs.]

The author describes gastro-enteritis of carnivorous animals in zoological gardens. Bacteriological research and inoculation experiments on laboratory and other animals were carried out with material obtained from animals which had succumbed to the natural affection. In a second series of experiments, bacteria-free Chamberland L3 filtrates prepared from the blood, spleen, kidney and mesenteric lymph gland of a puma were inoculated subcutaneously into cats, dogs, jackals, foxes and ferrets. All the animals which received filtrates from kidney and mesenteric lymph gland remained healthy. A young fox and a young jackal, which received blood filtrate, showed symptoms on the eighth day and died. A ferret and a jackal which received spleen filtrate succumbed to acute gastro-enteritis on the eighth day after inoculation, and a dog died on the tenth day without having shown definite symptoms. It is concluded that this disease of zoological carnivora is caused by a filtrable virus which is present in the blood and spleen, and that the affection differs from infectious (spirochaetal) gastro-enteritis of the dog and from infectious gastro-enteritis of the cat.—D. R. Wilson.

Smith, W. (1935). **Cultivation of the Virus of Influenza.**—*Brit. J. exp. Path.* **16.** 508-512. [5 refs.]

In fully controlled experiments, Smith obtained considerable multiplication of swine and human influenza virus, first (irregularly) on the chorio-allantoic membrane of the developing hen's egg, and from this in minced chick embryo-Tyrode medium. In the former cultures virus did not invade the embryo; in the latter it was closely associated with the tissue present. In neither case were specific histological lesions detected. Culture virus reproduced the typical disease in ferrets and mice.—E. Weston Hurst.

I. Levaditi, C., & Vieuchange, J. (1935). Inoculabilité de certains virus neurotropes (herpès, poliomyélite) par la voie du conduit auditif externe. **[Inoculation of Neurotropic Viruses by the Aural Route].**—*C. R. Acad. Sci., Paris.* **200.** 1800-1801.

II. Levaditi, C., & Vieuchange, J. (1935). Inoculabilité de certains virus neurotropes (hèrpes, en particulier) par la voie du conduit auditif externe.

**[Inoculation of Neurotropic Viruses by the Aural Route].**—*C. R. Soc. Biol. Paris.* **119.** 949-951. [1 ref.]

I. The authors succeeded in infecting rabbits with herpes by applying a suspension of virus to the external ear, by direct instillations or by placing a tampon soaked in it in the external acoustic meatus. This treatment caused a herpetic encephalitis in seven to 15 days.

II. In rabbits infected by the method described above, it was found that histopathologically the external ear near the tympanum shows hypertrophy of the epithelium, some of the cells showing oxyphile staining and an accumulation of polynuclear cells forms a pocket of pus. The small vessels are dilated and monocytes surround them. The conjunctival tissue is invaded by lymphocytes, large monocytes and polynuclear cells.

A definite suppuration occurs in the middle ear. Monocytes and polynuclear cells are again found surrounding the vessels. The intensity of the otitis varies from case to case.

*Post-mortem* examination of a rabbit killed eight days after inoculation revealed no lesions in the central nervous system. A second rabbit, killed two days later, revealed lesions in associated parts of the nervous system.

The writers consider that, subsequent to the local reaction, the virus travels along the nerves supplying the external and middle ears, and thence to the nerve centres.—F. H. Manley.

Meyer, K. F. (1935). **Psittacosis.**—*12th Int. vet. Congr. 1934.* **3.** 182-205. 1 fig., 3 tables, 2 charts. [French, German and Spanish summaries].

Avian psittacosis may be acute, atypical or take the form of a latent infection. Immature birds are more susceptible than adults and are more frequently affected. Mature birds are often immune. As the symptoms shown by affected birds are not diagnostic, the autopsy and laboratory examinations are important.

"A parrakeet dead or acutely ill or recently recovered from an attack of psittacosis shows at post-mortem the following: A few drops of mucus on the ceres; a clean or slightly soiled anus; thin, atrophic pectoral muscles; a large, heavy and tough, slightly saffron- to ocher-colored liver, occasionally (in about 10 percent) studded with fresh or partially healed necroses and infarcts; slightly enlarged and congested spleen; rarely a few consolidated patches in the lower portions of one or both lobes of the lungs."

Direct smears from the spleen, adequately stained, frequently reveal Gram-negative, oval or spherical inclusion (Levinthal-Cole-Lillie) bodies similar to those found in virulent human and parrot tissues. These bodies are claimed to have the same diagnostic value as the Negri bodies in rabies.

The mouse is the most convenient animal for use in laboratory investigations. Amongst the numerous bird species which have been shown to be susceptible is the fowl. Young chickens may be infected either by exposure to sick birds or by injection.—Gwilym O. Davies.

Oberling, C., & Guérin, M. (1934). La leucémie érythroblastique ou érythroblastose transmissible des poules. **[Erythroblastic Leucaemia or Erythroblastosis in Fowls].**—*Bull. Ass. franç. Cancer.* **23.** 38-82. 7 figs., 3 plates, 1 table. [Numerous refs.]

The clinical entity of erythroblastic leucaemia is defined and an attempt is made to correlate the condition described in this paper with the blood disease of birds reported elsewhere.

Young birds are particularly susceptible. Symptoms of the disease, which has a normal duration of from two to four weeks, are indefinite, but include anaemia associated with changes in the numbers and shapes of the blood cells and the

usual signs of ill health. Blood changes include a reduction in the red blood cell count and in the haemoglobin content, together with a rise in the white cell count. Erythrocytes show anisocytosis, poikilocytosis and polychromasia, whilst undeveloped erythrocytes are numerous. Changes in the appearance of myelocytes and myeloblasts are important and are illustrated in a coloured plate. Changes in the monocytes and lymphocytes are less significant. The principal *post-mortem* lesion consists of hyperplasia of haemopoietic tissue, the spleen in particular being very enlarged. Histologically, bone-marrow shows the most striking changes in the form of abnormal-shaped elementary forms of erythrocytes which plug the sinuses. A considerable portion of the lymphoid tissue of the spleen is replaced by erythroblastic elements. The liver, kidney, lung and fatty tissues show a similar type of congestion.

Erythroblastosis can be transmitted artificially by injections of infected blood or tissue emulsion. Emulsions filtered through Chamberland L candles (using *Vibrio cholerae* as control) remained infective ; such emulsions resisted the action of glycerin for five months. Following artificial inoculation, the infective agent rapidly disappeared from the blood stream for about two weeks, during which period it was probably multiplying in the haemopoietic tissues ; thereafter it reappeared in the peripheral circulation. Absolute immunity against reinfection did not appear to exist. After an attack a bird generally resisted generalized reinfection, but might show localized reinfection in predilection sites of a proliferative neoplastic type of disease. The relation of such neoplastic lesions to true neoplasms is discussed.—E. J. Pullinger.

Dobson, N. (1935). **Infectious Laryngo-Tracheitis in Poultry.**—*Vet. Rec.* **15.** 1467-1471. 5 figs.

This article records the occurrence of the disease in Great Britain and gives an account of the history of the outbreak and of the work done to establish the diagnosis [see also this *Bull.* **6.** 41].—W. J. Ironside.

Kessel, J. F., Fisk, R. T., & Prouty, C. C. (1934). **Studies with the Californian Strain of the Virus of Infectious Myxomatosis.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2927-2939. 12 figs. [Numerous refs.]

Infectious myxomatosis was first recorded outside South America in 1930 when it was first recognized in California. It is a highly infectious and fatal disease of domestic rabbits caused by a filtrable virus. The Californian strain is slightly less virulent than the South American strain and gives rise to lesions which differ only in degree and in the absence of inclusion bodies. Otherwise these two strains appear to be identical.—Gwilym O. Davies.

I. Kuttner, Ann G., & T'ung, T. (1935). **Further Studies on the Submaxillary Gland Viruses of Rats and Guinea Pigs.**—*J. exp. Med.* **62.** 805-822. 9 figs. on 2 plates. [21 refs.]

II. Thompson, Juanita. (1936). **Salivary Gland Disease of Mice.**—*J. infect. Dis.* **58.** 59-63. 2 figs. [5 refs.]

Both papers re-affirm the species specificity of the various salivary gland viruses, and their localization and indefinite persistence in the salivary glands after inoculation by all routes.

I. Kuttner and T'ung's experiments were with the homologous viruses in rats and guinea pigs. Intracerebral passage was negative after the second transfer even when virus was mixed with testicular extract (Duran-Reynals factor) or the animal was exposed to X-rays. Extracts of brain did not reduce, neither did those of testis enhance, the activity of virus given subcutaneously ; two weeks after

inoculation, virus was present in the cervical lymph nodes, kidney and lung in lower concentration than in the submaxillary gland, and absent from the blood, liver and spleen. Intrarenal inoculation produced only circumscribed lesions, though in the absence of lesions, virus was present in the kidney in spontaneous infections. Intratracheal inoculation led to a virus pneumonia with inclusions, but did not facilitate the growth of bacteria. Intratesticular inoculation evoked only mild interstitial inflammation.

II. Thompson transmitted the disease of Toronto mice to a previously uninfected New York stock. Organs other than the salivary glands were uninfective. Of 50 mice infected intracerebrally, 12 showed slight mononuclear meningitis with specific inclusions ; in four of these, slight changes were present in the nervous tissues. In the submaxillary glands, the characteristic inclusions nearly always accompanied the chronic inflammatory foci, though topographically the two appearances were not definitely related.—E. Weston Hurst.

I. Doyle, T. M. (1935). **Fowl Pox.**—*12th Int. vet. Congr. 1934.* **3.** 206-218. [French, German and Spanish summaries].
II. Johnson, W. T. (1935). **Fowl Pox.**—*Ibid.* 219-233. [Numerous refs.] [French, German and Spanish summaries].
III. —. (1935). **Discussion of Papers on Fowl Pox.**—*Ibid.* 234.

I. Doyle reviews his own work and that of other investigators on fowl pox since the Eleventh International Veterinary Congress (1930).

Concerning the inclusion bodies present in the cells in the skin lesions, evidence appears to favour the view that they are in reality the causal agents. Suspensions of the elementary bodies contained in the cell inclusions are agglutinated by sera from recovered birds.

There appears to be little doubt that certain biting flies and mosquitoes are capable of transmitting fowl pox from infected to healthy fowls but, in Doyle's opinion, the importance of this fact has been exaggerated. " Direct infection from diseased to normal fowls is probably the most important method of transmission ".

Of the two principal methods of immunization, the unattenuated pigeon pox virus method appears to be the better. It is free from the " varying degree of constitutional disturbance and a considerable risk of generalization of the infection " which attends the use of the unattenuated fowl pox virus. It is recommended that the annual inoculation of all young stock with pigeon pox virus should be a routine procedure.

II. Johnson questions the validity of Doyle's viewpoint that vaccination with fowl virus is followed by severe constitutional disturbances. He considers the fowl virus to be superior to the pigeon virus and states that " it is apparent from the results in America that pigeon virus cannot be recommended for use in this country as a sole source of pox control, if at all ". He found that all methods affected egg production.

The author considers that the " stick " method of vaccination is to be preferred to the follicle method. In the " stick " method, a sharp-pointed blade is used, which is wrapped with some protective material leaving an exposed point of $\frac{3}{32}$ of an inch. The principle is to thrust this into the skin of the leg and simultaneously to introduce the virus.

III. In the discussion, Johnson stated that the drop in egg production after vaccinating a flock of heavily producing hens was variable, but that there was often a 50 per cent. decrease for about three weeks. He emphasized the need for a modified virus which would permit the vaccination of laying flocks without affecting egg production.—Gwilym O. Davies.

Basset, J. (1935). Variole aviaire. Le virus des colombins chez les gallinacés. Vaccination du pigeon. [**Vaccination of Pigeons and Fowls against Avian Pox**].—*Rev. vét., Toulouse.* **87.** 553-559. 1 fig. on 1 plate. [1 ref.]

Conclusions previously published by the author are as follows :– (1) inoculation of fowls with virulent fowl pox virus creates an immunity 18 to 20 days after inoculation which persists for nine months and never entirely disappears, and (2) the inoculation should be made with a measured dose into the pectoral muscle ; this eliminates the associated dangers. Some general reaction develops two or three weeks after the inoculation, but no noticeable lesions are produced.

Ten cockerels were given large cutaneous inoculations with pigeon virus. The reactions produced were mild and the lesions soon disappeared.

Cockerels were also inoculated intramuscularly. Fowl virus conferred a solid and lasting immunity against subsequent inoculation with homologous virus, but pigeon virus only produced a partial immunity against subsequent inoculation with fowl virus.

If the pigeon virus is inoculated into the fowl on a large area, a complete immunity results, but this inoculation is not practicable. The author considers that the immunity produced is in direct proportion to the pathogenicity of the vaccine.

Intramuscular inoculation of the homologous virus is recommended for fowls. Similarly, it is necessary to use the homologous virus for pigeons. Of five young pigeons vaccinated, three developed complete and two partial protection against subsequent artificial inoculation.—F. H. Manley.

## PARASITOLOGY, GENERAL.

Allen, J. A. (1934). **Parasites of Fur Bearing Animals.**—*Proc. 5th Pacif. Sci. Congr. Can. 1933.* pp. 2981-2989. [18 refs.]

In the early days of fur-farming there was little or no trouble from parasitic infestation but, as the industry grew, parasitic worms began to threaten it and, although by the rigorous practice of the necessary preventive methods they are now usually kept within bounds, parasites are still regarded as the greatest potential menace to the fur-farmer. The economic importance of ascarids, hookworms, lungworms, the fluke *Troglotrenia solmincola*, and parasitic acari is briefly discussed. In the section dealing with control measures the author states that carbon tetrachloride and oil of chenopodium are the only two dependable anthelmintics for fur-bearing animals. Oil of chenopodium is preferred to carbon tetrachloride, one part of the anthelmintic mixed with 20 parts of castor oil being a favourite formula. No effective and safe anthelmintic is yet known for use in members of the weasel family.

The paper ends with an incomplete list of the endo- and ecto-parasites of fur-bearing animals.—E. L. Taylor.

Koegel, A. (1935). Parasitologische Beobachtungen an Angora-Ziegen und anatolischen Schafen. [**Parasitological Observations of Goats and Sheep in Turkey**].—*Münch. tierärztl. Wschr.* **86.** 517-519.

The examination of 100 angora goats in Turkey showed them to be carrying the following parasites in the percentages indicated :– *Coccidia* 74, *Fasciola magna* 10, *F. hepatica* 12, *Monieza* spp. 17, lungworms 24, *Haemonchus contortus* 30, *Trichostrongylus* 28, *Ostertagia* 23, *Strongyloides* 14, *Nematodirus* 12, *Oesophagostomum* 20, *Bunostomum* 12, *Trichuris* 10, and *Cooperia* 1 per cent. *Ascaris* and

*Chabertia* were not found. An account is also given of a flock of sheep in a certain part of the country where the incidence of parasites was greatly below that observed elsewhere. [Koegel does not state how he differentiated between the various strongylid species by faecal examination. This is generally considered to be exceedingly difficult and for some species cannot be done with certainty].—E. L. T.

## PARASITOLOGY (ARTHROPODS IN RELATION TO DISEASE).

Bishopp, F. C. (1935). **Ticks and the Role they play in the Transmission of Diseases.**—*Rep. Smithson. Instn. 1932-33.* pp. 389-406. 1 fig., 9 plates.

This is an interesting general article, dealing mainly with the bionomics of those ticks which are the carriers of diseases of man and animals in the United States of America. The species dealt with are *Argas miniatus* of the fowl, *Ornithodorus megnini* (the spinose ear tick), *O. turicata* (the relapsing fever tick), *Haemaphysalis leporis-palustris* (carrier of tularaemia), *Amblyomma americanum* (which is said to cause serious losses in chickens and turkeys), *Dermacentor albipictus* (the moose tick which is becoming a serious pest of horses and cattle in Texas and New Mexico), *D. variabilis* (the dog tick which transmits Eastern Rocky Mountain spotted fever), *D. andersoni* (the transmitter of Rocky Mountain spotted fever) and *Rhipicephalus sanguineus* (a dog tick which may also become a troublesome household pest).—U. F. Richardson.

de Jesus, Z. (1935). **The Cattle Tick Pest in the Philippines – Its Control and Eradication.**—*Philipp. J. anim. Indust.* **2.** 263-283. 3 text figs., 5 figs. on 2 plates, 3 tables. [13 refs.]

The Australian cattle tick – *Boophilus australis* (*B. microplus*) – is very prevalent in the Philippines and causes serious losses in local cattle by skin irritation and abstraction of blood (computed at 8 lb. of blood per thousand ticks at one feed). In addition, these ticks transmit redwater and anaplasmosis, diseases which are often fatal to imported stock and retard the development of locally-bred animals. As the result of experiments, the author concludes that larvae can resist starvation for 98 days, but that grass burning will destroy the majority of larvae if burning is not employed until 30 days after cattle have been removed from the pasture. The ticks will live on horses, buffaloes and goats but not on sheep or dogs. Gordura grass is recommended as a tick repellent, seed ticks dying on leaves in 40 to 60 days, and being unable to reach the top of the leaves. This grass is said to be succulent and nutritious. Rotation of pasture, spraying with a 20 per cent. petroleum emulsion, and fortnightly arsenical dips are also recommended for the destruction of this species of tick.—U. F. Richardson.

Sen, S. K. (1935). **The Mechanism of Feeding in Ticks.**—*Parasitology.* **27.** 355-368. 15 figs. [11 refs.]

Sen shows that the feeding mechanism in ticks is different from the previously accepted belief ; in fact, neither the chelicerae nor the hypostome functions in the act of drawing blood. The sucking apparatus is a stylet which is a tubular continuation of the pharynx and which is apparently the homologue of the hypopharynx of other blood-sucking arthropods. The stylet is extremely refractile and it is believed to have escaped detection on that account. It is suggested that the chelicerae are comparable to the labrum-epipharynx of blood-sucking insects and that the hypostome of ticks presents a similarity to the labium of insects. The observations recorded in this paper were made on specimens of *Ornithodorus papillipes* Birula (*O. crossi* Brumpt).—J. S. Steward.

ROUBAUD, E. (1935). Les modalités atypiques de l'infection trypanosomienne cyclique chez les glossines. [**Atypical Modifications in the Cycle of Trypanosome Infections in Tsetse Fly**].—*Ann. Inst. Pasteur.* **55.** 340-364. 5 figs. [Numerous refs.]

The author draws attention to observations that he has made from time to time on irregular conditions which he has encountered in dissecting tsetse flies infected with various trypanosomes. The simplest infection is that with organisms of the *Tryp. vivax* group, as they are first established in the labial cavity and later invade the hypopharynx in which positions the metacyclic forms develop. Although these forms appear on the second day, the tsetse fly does not become infective until the 16th day. In some cases no labial infection can be detected and in others no infection of the hypopharynx. The author explains these irregularities by assuming in the one case that a sterilization of the labial cavity may have occurred, and in the other case that the hypopharynx may have been emptied of trypanosomes during biting. Experiments carried out on the infectivity of tsetse flies indicated that great humidity inhibited the development of hypopharyngeal infection, whilst a very dry atmosphere was also inimical to the trypanosome cycle. Neither increased temperature nor the nature of the flies' food appeared to influence the development of infection. With *T. congolense*, gut infections may be encountered without infection of the proboscis, whilst a hypopharynx infection may occur without a gut infection. The latter condition may be explained by a sterilization of the gut and a retention of the proboscis infection, but the author considers that it is probable that a direct infection of the labrum may occur without a previous development in the gut.

In the case of *T. pecaudi* and *T. brucei*, infections of the proboscis have been encountered without any infection of the salivary glands, and it is considered that the salivary gland stage may be omitted in the development of these trypanosomes, and probably also in the cases of *T. gambiense* and *T. rhodesiense*. Cases have occurred in which infective trypanosomes have been encountered in the pharynx and the gut. The latter are explained by the swallowing of infective forms with the blood, but it is suggested that the infective pharyngeal forms may be due to swallowed saliva which might produce a medium suitable for the development of metacyclic forms in the pharynx.—U. F. RICHARDSON.

KELSER, R. A. (1935). **Mosquitoes as Vectors of the Virus of Equine Encephalomyelitis.**—*12th Int. vet. Congr. 1934.* **2.** 336-347. [3 refs.] [French, German and Spanish summaries].

In this paper, the author reviews his work on the transmission of the virus of equine encephalomyelitis by mosquitoes. [For his preliminary report on this subject, see this *Bull.* **4.** 107]. The fact that in the United States of America the disease is commonest in irrigated districts, and that it disappears suddenly with the onset of the cold weather, first led him to suspect the mosquito as a transmitting agent. In the experiments described, he succeeded in effecting passage of virus from guinea pigs to guinea pigs, guinea pigs to horses and from a horse back to guinea pigs through the medium of mosquitoes of the species *Aedes aegypti*. He found that these mosquitoes were able to transmit the disease as early as the sixth day after an infected meal, and that they remained infective for 42 days, the longest period infected mosquitoes were kept alive. He points out that, in the districts in which the disease occurs naturally in the U.S.A., mosquitoes of the particular species used in his experiments are not constantly present, although other species of *Aedes* may be prevalent.

The paper includes a description of the method adopted for rearing mosquitoes, and details of the blood-feeding arrangements.

Experiments were also conducted on the spread of the disease from infected to healthy horses by continuous close contact, the results obtained being negative. —C. DAVENPORT.

EDWARDS, L. T. (1935). **Impaction of the Rumen in Cattle due to the Ingestion of the Cocoons of the Caterpillar** *Gonometa rufobrunnea* **Auiw.**—*J. S. Afr. vet. med. Ass.* **6.** 188-191. 2 figs.

This article records mortality in cattle from impaction of the rumen with cocoons of *G. rufobrunnea* occurring on the leaves of mopani trees in the Northern Transvaal. The effect was a purely mechanical one as no toxicity could be demonstrated in the pupae by feeding them to rabbits. Treatment is of no avail and the only preventive method of any value is the removal of cattle from the neighbourhood of infested trees.—E. M. ROBINSON.

## PARASITOLOGY (DISEASES CAUSED BY HELMINTH PARASITES).

LUKASIAK, J. (1935). Robaki pasorzytnicze i ich lokalizacja u psów w Warszawie. [**Helminth Parasites of Dogs in Warsaw**].—*Wiad. weteryn.* **14.** 477-487. 4 tables. [11 refs.] [French summary : abst. from orig.]

The author examined 121 dogs in Warsaw in order to determine the frequency of parasitic infestation in various organs. 77 per cent. of the animals examined were infested and 63 per cent. harboured intestinal parasites. Nematodes slightly exceeded cestodes in frequency. The author emphasizes that among the nematodes he found *Dirofilaria immitis*, which he considers to be a rare occurrence in Poland. At the same time he gives a description of *Dioctophyme renale* which invades its host by a route still unknown.—K. SZCZUDLOWSKI (LWÓW).

WIGAND, R. (1935). Ueber die Konkurrenz von Darmparasiten. I. Taenia serrata und Diphyllobothrium latum im Dünndarm des Hundes nach experimenteller Verfütterung von Diphyllobothrium-Plerozerkoiden zu einer bereits verhandenen Taenia serrata. [**The Concurrence of Intestinal Parasites. I.** *T. serrata* **and** *D. latum* **in Dogs**].—*Zlb. Bakt. I.* (*Orig.*). **135.** 216-220. 1 fig., 1 graph. [3 refs.]

In the examination of 250 persons in East Prussia, a concurrence of two or three species of parasitic worms was observed in several instances. Some species very rarely occurred together and the concurrence of *T. serrata* and *D. latum* was not observed at all. In an attempt to investigate this experimentally, a dog which was known to be infested with some species of *Taenia* was fed with 26 plerocercoids of *D. latum*. As a result, mature worms developed and eggs of *Diphyllobothrium* were passed over a period of five and a half months, after which time they ceased to appear and the dog was killed. It was found on *post-mortem* examination that the dog harboured one specimen of *T. serrata* but no *Diphyllobothrium*. From this it is argued that *T. serrata* is antagonistic to *D. latum*.—E. L. TAYLOR.

LÜTZEN, M. W., & BOVIEN, P. (1934). Leveriktens forekomst og bekaempelse paa Faerøerne. [*Fasciola hepatica* **in the Faeroe Islands**].—*10th Beretn. LandbrFörsög. Farôe.* pp. 33. 5 figs., 3 tables. [English summary : abst. from orig.]

Liver fluke infestation, which for years has been causing heavy losses to the

sheep-farming industry in the Faeroe Islands, has in recent years become still more serious owing to the fact that old, well-established methods of sheep management and the old system of surface drainage of low-lying pastures have been neglected.

In 1928 and subsequent years the authors collected information from various sources in order to find out the distribution of the fluke. They found that it occurred in low-lying land practically all over the isles.

According to earlier work, the most common fresh-water snail found in the Faeroe Islands was *Limnaea ovata*, whereas *L. truncatula* was reported to be exceedingly rare. It was, therefore, believed that *L. ovata* possibly served as an intermediate host for the liver fluke. The authors' search revealed, however, that *L. truncatula* was not so rare after all, but that it is much more fastidious as to the choice of surroundings. Thus it was never found on pastures higher than about 330 feet above sea level. Developmental stages of the fluke were demonstrated in about 5 per cent. of the species of *L. truncatula* collected and examined, but never in *L. ovata*.

An experiment is also described in which the curative efficacy of distol was tried, but other well-known measures are recommended for controlling the disease.

—Gustav Naerland (Farsund).

Vogel, H. (1934). Der Entwicklungszyklus von Opisthorchis felineus (Riv.) nebst Bemerkungen über die Systematik und Epidemiologie. **[The Life-History of *Opisthorchis felineus* (Riv.) with Notes on the Classification and Epidemiology].**—*Zoologica, Stuttgart.* **33.** No. 86. pp. 103. 8 text figs., 45 figs. on 8 plates, 5 tables. [100 refs.]

This monograph, illustrated with exceptionally good photomicrographs, gives a complete account of what is known of the life-cycle of *O. felineus*, much of which is the author's own work, describes the morphology and discusses the systematic position of the parasite and its method of distribution.

The first intermediate host is the water snail, *Bithynia leachi* Shepp. When the eggs are laid they contain a fully developed miracidium and are able to retain their vitality, unhatched, for several months ; free miracidiae soon die in water, however, and the eggs do not normally hatch except in the intestine of the snail in response to the chemical and physical forces there. The sporocyst develops in the neighbourhood of the gut of the snail and in 25 to 30 days reaches a length of 1·2 to 1·85 mm. Rediae appear and begin to wander in the snail in about one month, and about one month later the cercariae (which have left the rediae before they are mature) begin to leave the snail. The cercariae, which are in a greater degree positively geotropic than positively phototropic, tend to lie quiescent at the bottom of the water ; they are easily stimulated to rapid movement, however, by sudden changes of light intensity, or currents set up in the water, as by passing fish, and so find their second intermediate host. Golden tench and golden orfe have proved to be suitable experimental hosts ; the cercariae penetrate the skin within 15 minutes, and begin to wander in the tissues (not in the blood vessels) of the fish and become encysted and encapsulated in the muscles or in the connective tissue. The metacercaria is three or four times as large as the cercaria and at a water temperature of 18° to 20°C. is mature in six weeks. On being eaten by a suitable host the outer of the two cyst walls in which the metacercaria is enclosed becomes digested in the duodenum, the metacercaria is stimulated to movement and breaks through the inner capsule. This excystation takes place in from 20 seconds to one and a half minutes but, as has been observed *in vitro*, takes much longer if the cyst is not first exposed to the action of peptic juice. The young flukes thus liberated

make their way up the bile duct into the liver and egg-laying begins between the third and fourth week after infection has taken place, the shortest period for the complete life-cycle being four to four and a half months.—E. L. Taylor.

Benoit, R. (1935). Contribution à l'étude des nodules et des kystes parasitaires du foie chez le cheval. [**Parasitic Cysts of the Liver in the Horse**].—*Schweiz. Arch. Tierheilk.* **77.** 462-470. 4 figs. [5 refs.] [In French].

Benoit reports on his observations on nodules in the livers of 2,000 horses killed in the abattoir at Lausanne. 37 per cent. of these were found to have parasitic nodules on the liver, which he divided into three classes :– " primary nodules ", soft and translucent ; " secondary nodules ", fibrous but easily cut – these often have a core, and " tertiary nodules ", more or less completely calcified. 13·5 per cent. of the nodular livers were found to contain eggs of *Fasciola hepatica* in the nodules, echinococcus cysts were found in 1·8 per cent., but nematodes were only very frequently found to be associated with the nodules. 2·5 per cent. of the nodules examined were found to be the result of the presence of foreign bodies, such as the awns of oats originating from the alimentary canal. Two of the 2,000 livers were found to be infested with *F. magna*, one severely. —E. L. Taylor.

Christiansen, M. (1935). Forsøg med overførelse af kvaeser (Coenurus cerebralis) til kalve og lam. [**Transmission Experiments of** *C. cerebralis* **on Calves and Lambs**].—*Maanedsskr. Dyrlaeg.* **47.** 273-286. 3 figs. [2 refs.]

Some rather extensive outbreaks of coenurosis have occurred in Jutland for some years. It is to be noted that sheep and lambs never contracted the disease, only cattle. In feeding experiments with moderate numbers of onchospheres (about 300 to 1,500) on three lambs and two calves, it was shown that this parasite is quite as infective for lambs as for calves. The reason why spontaneous infestation in Denmark only occurs in cattle is believed to be because infested dogs live in closer proximity to cattle than to sheep. The number of sheep on Danish farms is generally very small.—H. C. Bendixen (Copenhagen).

Schmidt, K. (1935). Die Echinokokken-Krankheit in Palästina. [**Echinococcus Infection in Palestine**].—*Arch. Schiffs- u. Tropenhyg.* **39.** 453-464. 1 fig., 4 tables. [8 refs.]

Schmidt made an enquiry, through hospital and meat inspection records, into the incidence of echinococcus infection in man and domestic animals. 70 per cent. of sheep and 40 per cent. of cattle were found to be infected, but only 1 per cent. of goats. 129 human cases were admitted for hospital treatment between the years 1922 and 1935. Dogs and jackals act as intermediate hosts, bad abattoir hygiene providing the opportunity for them to acquire infection.—E. L. Taylor.

Poisson, H. (1934). Note sur une localisation curieuse du *Cysticercus bovis*. [**Unusual Localization of** *C. bovis*].—*Bull. Soc. Path. exot.* **27.** 956-957. [2 refs.] [Copied *verbatim* from *Trop. Dis. Bull.* **32.** 632. Signed C. L.]

It is believed that in the calf *C. bovis* may occur in the liver, since a man who had been ordered raw liver passed a headless *Taenia saginata* and denied having eaten raw beef.

Palimpsestow, M. A., & Tschebotarew, R. S. (1935). Zur Frage der Therapie bei Passalurose (Passalurus ambiguus) des Kaninchens. [**Treatment of**

**Passalurus Infestation in Rabbits**].—*Tierärztl. Rdsch.* **41.** 709-711. 2 tables. [5 refs.]

The authors consider parasitic worms to be of great economic importance to the rabbit industry. They found *P. ambiguus* in 97·2 per cent. of six-month-old rabbits, in 20 per cent. of 18-month-old rabbits, and absent from adults over two years old. Of three diagnostic methods tried, the best method of determining the presence of this worm was found to be that of scraping the peri-anal region after wetting with 50 per cent. glycerin. The best anthelmintic results were obtained with a mixture of naphthalene (0·2 g.) and calomel (0·06 g.) given on three successive days and repeated three times at intervals of ten days.—E. L. T.

I. Dikmans, G., & Andrews, J. S. (1933). **A Comparative Morphological Study of the Infective Larvae of the Common Nematodes Parasitic in the Alimentary Tract of Sheep.**—*Trans. Amer. micr. Soc.* **52.** 1-25. 6 plates, 9 tables. [Numerous refs.]

II. Andrews, J. S. (1935). **A Note on the Morphology of the Anterior Ends of the Infective Larvae of Some Nematodes Parasitic in the Alimentary Tract of Sheep.**—*Proc. helminth. Soc. Wash.* **2.** 88-90. 1 fig.

I. This careful study was made on living larvae " quietened down with Fleming's fluid ". The authors found that there was considerable overlapping in the lengths of tails and tail sheaths (which had been the principal means of differentiation used by previous investigators) and place considerable reliance upon the shape of the buccal capsule and cuticularized structures at the anterior end of the oesophagus in some of the species. Tables are given summarizing their own observations on sizes and minute morphological differences, and comparisons are made with the various measurements given by different authors. They consider that an accurate generic diagnosis under the low power of the binocular microscope " is very difficult " especially where mixtures of the Trichostrongylidae are concerned ; some larvae can be recognized with certainty but it is clear that the authors are not satisfied that all can be recognized, as they conclude by stating that the only safe way to handle the problem of accurate diagnosis in studying the life-histories of these parasites is to begin with larvae obtained from the eggs taken from adult worms of known species and to keep each species isolated in separate hosts.

II. The author here makes some additions and corrections to his previous work. It has been found that the morphology of the buccal capsule of the larvae of *Haemonchus contortus* and *Ostertagia circumcincta* is of no value for differentiation. Further detail is given about the " oval bodies " mentioned in connexion with the oesophagus of *Cooperia* spp. and the anterior end of the oesophagus of *Monodontus trigonocephalus*, as well as on some other points. A new key is given for the identification of these larvae.—E. L. Taylor.

Lührs, E. (1935). Die wirtschaftliche Bedeutung des Spulwurmbefalls der Schweine. [**The Economic Importance of Ascariasis in Pigs**].—*Dtsch. tierärztl. Wschr.* **43.** 691-693. 2 tables.

Lührs made observations on the weights of 33 young pigs on a certain big farm known to be heavily infested with ascaris. The pigs, which were of approximately the same age, were first examined by a salt flotation technique for the presence of ascaris and it was found that 19 were infected and 14 free from infection. The fortnightly weighings taken over a period of six weeks showed that the ascaris-free pigs made a gain in weight which was 31·3 per cent. more than that made by the infected pigs. Lührs makes a calculation on these data and concludes that

the annual loss to the country in this way is about RM.48,100,000. He considers that 30 per cent. of young pigs die as a result of ascaris infection, representing a further RM.10,043,088, which brings the total annual loss from *A. lumbricoides* infestation of pigs to RM.58,143,088.—E. L. Taylor.

Kasprzak, Z. (1935). Przyczynek do wrazliwosci wlosni nieotorbionych w miesie peklowanem na dzialanie solanki. [**Viability in Brine of Unencysted Trichinae Contained in Meat**].—*Przegl. wet.* **48.** 552-568. 18 tables, 1 graph. [Numerous refs.]

The viability of unencysted trichinae contained in meat preserved in brine is dependent upon the salt concentration. The unencysted trichinae in the meat are killed in a concentration of over 9·5 per cent. of salt. The length of time the meat is left in the brine is not of so much importance as the concentration. —K. Szczudlowski (Lwów).

Nolf, L. O., & Edney, J. M. (1935). **Minimum Time Required by *Trichinella spiralis* to produce Infective Larvae.**—*J. Parasit.* **21.** 313-314.

Seven laboratory rats were infected with 5,000 larvae each ; one of these was killed each day between the 15th day and the 21st day after infection, the carcass being fed to two uninfected rats. All those receiving carcasses of rats which had been infected for 17 days or over became infected ; 17 days, is, therefore, the minimum time required for the production of infective larvae by *T. spiralis*. The examination of crush preparations of the diaphragms of the infected rats showed that 17 days is also the minimum time for the appearance of the larvae in the muscles.—E. L. Taylor.

Kraneveld, F. C. (1935). Stephanofilariosis. VI. Enkele bijzonderheden betreffende het lijden. [**Stephanofilariasis. VI.**]—*Ned.-ind. Bl. Diergeneesk.* **47.** 183-186. [2 refs.] [English and German summaries : abst. from orig.] [For abst. of previous articles of this series, see this *Bull.* **4.** 663 and **5.** 280].

The disease has now been observed in all breeds of cattle – Javanese, Dutch, Indian and Australian and in crosses between them – on the islands of Java, Sumatra and Billiton.

Goats are susceptible, and lesions have been found more scattered about the body than is the case with cattle, in which the withers is the common site.

For diagnosis, skin scrapings and scabs should be sent in glycerin water and sections of skin in 10 per cent. formalin.—J. E.

Rebrassier, R. E. (1935). **A Note on Oncicola canis (Kaupp), a Parasite of the Dog.**—*J. Amer. vet. med. Ass.* **87.** 573-574. [6 refs.]

*O. canis* is recorded from the intestine of a stray dog in Ohio. There have been only seven previous records of its occurrence in dogs in the United States of America. It is a small parasite and belongs to the class Acanthocephala, and in several of the previous records was reported as *Echinorhynchus canis*.—J. S. S.

## IMMUNITY.

I. Sergent, Ed., & Parrot, L. (1935). L'immunité, la prémunition et la résistance innée. [**Immunity, Premunition and Natural Resistance**].—*Arch. Inst. Pasteur Algér.* **13.** 279-319. 1 fig., 1 table. [6 refs.]

II. Sergent, Ed., & Parrot, L. (1935). Immunité et prémunition. [**Immunity and Premunition**].—*Ann. Inst. Pasteur.* **55.** 385-401. [5 refs.]

I. The authors draw attention to the fundamental differences between immunity and premunition. In the former, after recovery from an acute infection, a state of resistance is induced whereby an animal is refractory to reinfection whereas, in the latter, a tolerance is acquired in the course of a chronic infection, a fact which implies the existence of a latent phase. A state of premunition can be conferred artificially only by living virus-vaccine, preferably by means of attenuated infective agents incapable of creating fresh reservoirs. The progress which has been made in premunition is illustrated by reference to diseases such as piroplasmosis, trypanosomiasis, tuberculosis, Johne's disease, syphilis and brucella infection [see also SERGENT, PARROT & DONATIEN – this *Bull.* **6**. 58].

II. An abbreviated account of I.—R. E. GLOVER.

I. CAMERON, T. W. M. (1935). **Immunity against Animal Parasites.**—*12th Int. vet. Congr. 1934.* **3.** 44-65. [French, German and Spanish summaries].

II. KOTLÁN, A. (1935). **Immunological Phenomena in the Field of Parasitology.**—*Ibid.* 65-75. [29 refs.] [French, German and Spanish summaries].

III. —. (1935). **Discussion of Papers on Immunity against Parasites.**—*Ibid.* 75-77.

I. Cameron reviews present knowledge on immunity to protozoan, helminth and some arthropod parasites (warble fly and bot fly larvae) under the headings " pathogenicity ", " mechanism of resistance in protozoa ", " immunity ", " breed immunity ", " acquired immunity and premunition ", " tolerance ", " hypersensitiveness ", " serology " and " toxins ". He summarizes the position by saying that, with few exceptions, vertebrate hosts are naturally immune to parasites of physiologically unrelated animals. Animals are more tolerant to the presence of their own parasites than to those which normally occur in other hosts : they therefore tend to overcome such parasites. Premunition is a common phenomenon of immunity where protozoan parasites are concerned, and is occasionally seen in operation against metazoan parasites. Age resistance is frequently seen in those instances where animals are susceptible to parasites proper to physiologically related animals. The author contends that there is as yet little evidence of a true acquired immunity against adult helminths, although he maintains that there is no evidence that the processes of body resistance against the presence of animal parasites differ in principle from those operating against other body invaders.

II. The immunological relationship between zooparasites and their hosts is doubtless of the same fundamental nature as that of the bacterial parasite and host, the numerous specific variations which are observed representing perfections or imperfections in the adaptation of host to parasite and of parasite to host. Three related phenomena are observed :– " natural resistance ", which is best regarded as a passive incompatibility between host and parasite ; " age resistance ", regarded by Kotlán as a non-specific defence mechanism developing gradually as the host reaches maturity, and " acquired resistance ". This specific activity of the general defence mechanism he regards as definitely established for both protozoan and metazoan parasites. As an explanation for the phenomenon of natural resistance he mentions several interesting examples to show that host temperature, metabolic factors, such as pH concentration and concentration of calcium or other salts, nutritional factors and activities of the reticulo-endothelial system play an important part. Several examples of age resistance and of acquired resistance are also given. [Recent work suggests that two of these examples are not very good, as there would now appear to be some doubt as to the occurrence of age

immunity to coccidia in fowls and of acquired immunity to *Troglotrema salmincola* in dogs. Recovered dogs are immune to " salmon poisoning ", but not to reinfection with the fluke].

III. In the course of the discussion on these papers, HALL expressed the opinion that not a few but many worms appeared to have a wide range of adaptability, and he thought it probable that man had the longest list of parasites because he has adapted himself to a greater variety of environments than have any of the lower animals. Contributing to the same subject, DAUBNEY mentioned his own observations on the adaptation of the parasites of wild game to sheep in East Africa. He thought it probable that there is a definite connexion between the extent of tissue injury caused by a parasite and the grade of the immunity which it evokes. Calves infected with the onchospheres of *Taenia saginata* show a severe systemic reaction, and he thought it possible that some vaccine might eventually be produced. Hans THEILER pointed out that the immunization against chicken coccidiosis, which had been mentioned in CAMERON's paper, had been produced by small doses of the fully virulent organism.—E. L. TAYLOR.

SCHMIEDHOFFER, G. (1934). A malacok sertésorbánc és sertéspestis elleni védoojtásról, különös tekintettel a paratyphusra. **[The Protective Inoculation of Piglets against Swine Erysipelas and Swine Fever with Special Reference to Paratyphoid Infections].**—*Allatorv. Közl.* **31.** 127-131.

The author calls attention to the frequent occurrence of various diseases, particularly of paratyphoid in young pigs, as a result of the general aim of pig-breeders to raise the production of the Hungarian Mangalica breed. Losses due to these ailments are particularly heavy if vaccination is carried out prior to weaning. If early vaccination against swine erysipelas proves to be necessary, the author recommends the use of the simultaneous method, preferably carried out with swine serum instead of horse serum in order to prevent anaphylaxis in cases when subsequent serum treatment is necessary. As far as simultaneous inoculation against swine fever is concerned, experience shows that, while on the one hand too early treatment fails to produce a satisfactory immunity, it is on the other hand likely to activate dormant paratyphoid infection. Such inoculations should, therefore, be carried out only in cases when the owners are insistent. The author finally discusses preventive measures against paratyphoid infections in pigs.—A. KOTLÁN (BUDAPEST).

—. (1935). **The Nature of Tuberculin.**—*Lancet.* **228.** 1338. [4 refs.]

This note refers briefly to some recent work on the heat-resisting properties of tuberculin. DOUGLAS and HARTLEY [this *Bull.* **5.** 568.] have shown that, even after autoclaving, solutions of old tuberculin retain not less than half of their original activity. PARISH and O'BRIEN [this *Bull.* **6.** 352.] found that tuberculin clings to glass and is not removed by ordinary washing. The specific activity of tuberculin occurs in relatively small groups of amino-acids that resist disruption. —T. M. DOYLE.

SUTHERLAND, H. (1935). **Heat-Stability and " Tenacity " of Tuberculin. [Correspondence].**—*Brit. med. J.* Aug. 3rd. 232-233.

A previous article by PARISH and O'BRIEN [this *Bull.* **6.** 352.] referred to the advisability of using separate marked syringes for particular dilutions of tuberculin.

The author found that both T.R. and B.E. tuberculins are non-adherent to glass even after heat fixation, but that T.A.F. is very adherent. He filled a 1 c.c. syringe with T.A.F., emptied it and twice washed it out with 1 c.c. of carbol-saline

solution. A dose of 0·1 c.c. of the last washing was then injected intracutaneously into a sensitive patient ; this produced a +1 reaction 6 mm. in diameter.—C. V. W.

I. Nyary, G. (1934). Il mezzo di Long nella preparazione dell' "esotubercolina diagnostica" (E.T.F.). **[The Preparation of Finzi's Exotuberculin with Long's Medium]**.—*Profilassi* **7.** 253-256. [15 refs.] [English, French and Rumanian summaries : abst. from orig.]

II. Teixeira da Silveira, A. L. (1934). Il mezzo di Calmette, Massol e Breton nella preparazione dell' "esotubercolina diagnostica" (E.T.F.). **[The Method of Calmette, Massol and Breton for the Production of Exotuberculin]**.—*Ibid.* 299-302. [15 refs.] [English, French and Spanish summaries : abst. from orig.]

I. The author wished to determine whether exotuberculin could be prepared from media, the exact chemical composition of which was known. Long's medium, which contains asparagine, was chosen and comparison was made with growth on Sauton's medium. A virulent bovine strain of tubercle bacillus, which was known to produce exotuberculin in 30 days in glycerin broth, was used. The bacilli grew well in Long's medium and exotuberculin was prepared from 30, 75 and 110-day cultures. When tested on tuberculous cattle, this proved equally as active as exotuberculin prepared from Sauton's medium.

II. Using Calmette, Massol and Breton's medium, which contains 4 per cent. glucose and 1 per cent. peptone, the author cultivated virulent human and bovine strains of tubercle bacilli. Seven to eight days after inoculation a fine growth could be seen on the surface of the medium and, after 15 to 20 days, the growth was abundant. Exotuberculin was prepared from 30, 80 and 95-day cultures and was tested on tuberculous cattle against exotuberculin prepared from Sauton's medium. The experimental exotuberculins proved to be highly active and no difference in the reactions produced by the exotuberculin prepared from human and bovine strains of bacilli was noted. It appears that the active principles are at their maximum in the synthetic medium after about six weeks' incubation. The author considers that exotuberculin is far superior to old tuberculin.—J. A. N.

Holley, S. W. (1935). **Corneal Reactions of Normal and of Tuberculous Guinea Pigs to Tuberculo-Protein and Tuberculo-Phosphatide.**—*Amer. J. Path.* **11.** 937-951. 4 figs. on 2 plates. [17 refs.]

In these experiments, the corneal responses of normal guinea pigs and of animals infected with *Mycobact. tuberculosis* H.37 were studied. The substances used were Seibert's tuberculo-protein (T.P.T.) and Anderson's phosphatide (A3-a) and they were injected superficially into the cornea in very small doses. Very little reaction was noted with either product in normal animals, but the lipoid fraction was the more irritant. In the tuberculous guinea pigs, the first response to the tuberculo-protein was a polynuclear infiltration which was followed by the appearance of mononuclear cells. In the final stages numerous epithelioid cells were found. In general, these reactions closely resembled the allergic response to tuberculin and indicated a sensitivity to a protein. With the phosphatide, although the reactions were more intense, the sequence of events was similar and suggested that the lipoid fraction may have contained small amounts of protein. The possibility that the phosphatide enhances the action of the protein is discussed.
—R. E. Glover.

Boquet, A., & Laporte, R. (1935). Phenomène de Bail et intoxication tuberculinique. **[Bail's Phenomenon and Tuberculin Intoxication]**.—*C. R. Acad. Sci., Paris.* **200.** 2041-2043.

The intraperitoneal injection of massive doses of living or dead tubercle bacilli into tuberculous guinea pigs leads to the reaction known as Bail's phenomenon. Death occurs within a few hours with marked congestion and haemorrhage of the peritoneum and abdominal organs. Healthy guinea pigs show no immediate reaction even to much larger doses and merely succumb in the course of several weeks to progressive tuberculosis. Similar reactions occur when tuberculin is injected intraperitoneally into tuberculous guinea pigs. This phenomenon is attributed to tuberculin intoxication in animals already sensitized by infection.

Filtrates of peritoneal exudates from both healthy and tuberculous guinea pigs injected with dead bovine tubercle bacilli were shown to contain tuberculin by the intradermal injection of the filtrates into healthy and diseased animals.

Filtrates of pure suspensions of tubercle bacilli gave feeble intradermal reactions but filtrates of the bacterial suspensions mixed with peritoneal fluid, guinea pig serum, or a fresh horse serum gave marked reactions, thus demonstrating the solubility of the tuberculin in body fluids.—Gwilym O. Davies.

Vichélssky, S. N., Avakoumoff, M., Orloff, E., & Bessonoff, D. (1935). La réaction allergique pour le diagnostic de la brucellose des animaux domestiques. [**Allergic Tests in the Diagnosis of Brucella Infection in Domestic Animals**].—*Rec. Méd. vét.* **111.** 456-466. 6 tables. [3 refs.]

The authors describe the method of preparation of abortin at the Veterinary Scientific Institute of Moscow, the dose injected and the manner of its injection. They experimented successfully over a period of ten months on small animals, sheep, cattle, pigs and horses. These included " carrier " animals which had aborted and animals which had been experimentally infected.

The general conclusions reached were :– (a) that the use of the abortin gave much more exact results than the agglutination test, and (b) that, while it caused a specific allergic reaction in animals infected with brucella infection, repeated injections did not increase the sensitization of healthy animals towards new injections, nor lower the sensitization of infected animals towards new antigenic inoculations.—M. Burke.

Verge, J. (1935). Introduction à l'étude des réactions allergiques dans le diagnostic des maladies animales. [**Allergic Reactions in the Diagnosis of Animal Diseases**].—*Bull. Soc. vét. prat. Fr.* **19.** 215-224. [1 ref.]

The subject is discussed in three sections :– (1) the definition of allergy ; (2) the definition of anergy or anallergy, and (3) allergic and diagnostic reactions. Under each heading the author gives numerous examples.—G. Dods Munro.

I. Davesne, M. (1935). Contribution à l'étude du diagnostic de la brucellose bovine par la recherche des réactions allergiques. [**Allergic Diagnosis of Bovine Contagious Abortion**].—*Bull. Soc. vét. prat. Fr.* **19.** 120-138. 2 figs., 5 tables.

II. —. (1935). Du diagnostic de la brucellose bovine par les réactions allergiques. Discussion du travail de M. Davesne. [**The Allergic Diagnosis of Bovine Contagious Abortion. Discussion on Davesne's Paper**].—*Ibid.* 148-155.

I. The author, collaborating with ten other veterinarians, has tested five kinds of bacterial antigens :– (a) a suspension of a mixture of ten strains of *Brucella abortus* killed by formol in a concentration of $5 \times 10^9$ organisms per c.c. ; (b) similar to (a), but bacilli killed by heat ; (c) so-called " abortix A " – a suspension of 30 strains of dead *Br. abortus* containing three milliards of bacilli per c.c. ; (d) a lytic product of " abortix A ", and (e) a filtrate of a whole broth culture.

The site of the test for the bacterial antigens was the caudal fold (intradermal) and for the other two test products the lower eyelid (subcutaneous). Positive and negative reactions are detailed for the five types of test products. Over 1,000 tests were made in healthy, artificially infected and naturally infected cattle, and the author comes to the following conclusions :– in order of reliability the test substances were (1) the lytic product in a dose of 1 to 2 c.c. ; (2) " abortix A " in a dose of 0·2 c.c., and (3) the filtrate. The results obtained from allergic reactions often differ from those obtained in the same individual with agglutination reactions, and outside the period of ten to 20 days after an abortion there may be a divergence of 50 per cent. The author points out that a positive allergic reaction need not indicate that the animal will abort ; it may merely indicate a latent infection of the lymphatic system or of a hygroma, etc. The author thinks that these allergic tests will serve to diagnose the presence of the disease in a herd, but that doubtful or negative reactors should be submitted to the agglutination test later. Repeat tests can be made, but the reactions may thereby be lessened.

II. Cesari, who opened this discussion, first gives a survey concerning work on allergic tests as applied to the brucella group of bacteria since 1922. He then discusses the interpretation of results, the importance of using suitable strains of *Br. abortus* for the preparation of the test products and, finally, the great importance of these tests on account of the facility with which they can be used by the practising veterinarian. The trend of the discussion was to emphasize that the best test was found to be a subcutaneous palpebral one and not an intradermo-palpebral one.
—C. V. Watkins.

Nattan-Larrier, L. (1935). L'anaphylaxie héréditaire. [**Hereditary Anaphylaxis**].—*Rev. Immunol.* **1.** 455-479. [Numerous refs.]

This is a study of hereditary anaphylaxis in the guinea pig. The author states that all substances which render a pregnant guinea pig anaphylactic set up a temporary anaphylactic state in the young, which can be demonstrated at birth and for a period of approximately 70 to 80 days after birth. Such a passive sensitization occurs in the young if the mother is sensitized during or before pregnancy.

The passive nature of this phenomenon is due to the permeability of the placenta to " sensibilisines " [presumably anaphylactins], but its impermeability to the sensitizing substances. Active hereditary anaphylaxis is the result of some pathological or physiological change in the placenta which allows the passage of sensitizing substances to the foetus.

The author concludes with the suggestion that congenital anaphylaxis is a more suitable name than hereditary anaphylaxis.—Gwilym O. Davies.

Paille, R. (1935). Typhose aviaire et pouvoir agglutinant des oeufs. [**Agglutinating Power of the Eggs in** *Salmonella gallinarum* **Infection**].—*Rev. vét., Toulouse.* **87.** 578-580. [1 ref.]

The author shows that the yolk of eggs from hens affected with the chronic form of fowl typhoid has an agglutinating power equal to that of blood serum or whole blood. In all cases tested, the white of the eggs proved devoid of agglutinating power.

He describes a rapid agglutination test which may prove useful for testing suspected eggs intended for hatching purposes and also assist poultry keepers, who can now send eggs from their stock birds to a laboratory for an agglutination test instead of sending blood or blood serum samples.—C. V. Watkins.

VAN ROEKEL, H., & CLARKE, M. K. (1935). **The Whole Blood Agglutination Test for Pullorum Disease.**—*Bull. Mass. agric. Exp. Sta.* No. 323. pp. 24. 5 figs., 11 tables. [11 refs.]

The authors give a résumé of the research carried out by other workers on the subject, describe their own technique, and give an account of their experiments to determine the extent of the variation in the size of drops of antigen delivered by pipette, in the amount of blood contained in a loopful, and the influence of the blood-antigen dilution on agglutination.

In the field, they set out with the intention of applying the whole-blood test to commercial flocks until no reactors appeared, and of then checking the results by the application of the tube test. Two flocks were selected for this trial, but on account of the fact that reactors continued to appear, departure had to be made from the original plan and the tube test applied, so that the flocks could be used for breeding purposes. At the retest which followed the application of the tube test, no reactors were found in either flock.

Two other flocks were tested by both the whole-blood and tube methods. In one test, out of 1,053 birds, 40 reactors were found, 19 of which reacted to the tube test only, and two to the whole-blood test only. In the other, out of 906 birds tested, 16 slightly suspicious reactors were shown by the whole-blood test and 3 similar reactors by the tube test.

The authors conclude that the whole-blood test is not as efficient as the tube test but that, as it has several desirable features, an effort should be made to increase its efficiency.—W. J. IRONSIDE.

NANNI, C. (1935). Etude expérimentale sur l'importance de la peau dans la formation des agglutinines pendant l'immunisation générale. (Note préliminaire). [**The Role of the Skin in the Formation of Agglutinins**].—*Boll. Sez. ital. Soc. int. Microbiol.* **7.** 252-256. [In French].

Rabbits inoculated intravenously with killed *Salmonella typhi* developed a serum titre up to 1 : 10,000. Skin grafts from these rabbits on to uninoculated rabbits did not cause any appreciable development of agglutinins. The titres of the donors were raised to from 1 : 35,000 to 1 : 50,000 by the injection of living bacteria, and skin grafts on to fresh rabbits caused the development of titres up to 1 : 100. Typhoid agglutinins were present in extracts from the skin of the donor rabbits at titres of from 1 : 400 to 1 : 35,000.

The author excluded the possibility that an active immunization process had been set up by the skin grafts in the second series of experiments by carrying out blood and skin cultural tests, the results being negative. He proposed to test further if the agglutinin response was really due to the transfer of the contained blood or cellular elements in the skin grafts.—C. V. WATKINS.

BEDSON, S. P. (1935). **The Use of the Complement-Fixation Reaction in the Diagnosis of Human Psittacosis.**—*Lancet.* **229.** 1277-1280. 3 tables. [8 refs.]

In the course of many virus infections, a diagnosis can be established by the demonstration of neutralizing antibodies in the blood serum, but in psittacosis this is not always the case. Bedson advances the theory that this can be explained on the grounds that psittacosis virus possesses two antigens, one of which excites the production of neutralizing and the other of complement-fixing antibodies.

In this article, the results are given of complement-fixation tests on a series of human sera from suspected cases, together with a number of controls. [For details of the technique, see this *Bull.* **2.** 449]. The results show that the test

does give valuable assistance in the diagnosis of cases which are not revealed by other means. It is pointed out, however, that the fixing power of these sera is low and a carefully balanced test is, therefore, essential for accurate results. —R. E. Glover.

Zinn, H. (1935). Vergleichende Versuche mit Vollmilch, Magermilch und Milchserum zur Feststellung der Eutertuberkulose durch die Komplementbindungsmethode. **[The Use of Whole Milk, Skim Milk and Milk Serum in the Diagnosis of Udder Tuberculosis by Complement-Fixation].** —*Inaug. Diss., Berlin.* pp. 32. 4 figs., 12 tables. [Numerous refs.] [Also published in *Tierärztl. Rdsch.* **41.** 596-598 and 613-617].

The author describes the technique and method of reading tests. On a comparison of the results of examinations of 1,425 samples of milk, some being bulk samples and some from individual cows, by the complement-fixation test and by guinea pig inoculation, it was found that if whole milk was used there was close correlation between the two tests. According to the guinea pig test, 36 samples were positive whilst, according to the complement-fixation test, 44 were positive. Using skim milk or whey the differences were greater. [It need not necessarily be assumed that the complement-fixation test gave entirely erroneous results on eight occasions. It is quite possible that the udders were infected but were not excreting organisms at the time. Alternatively, the udders may not have been infected but the cows may have had a high antibody content of the blood with filtration of antibody through into the udder].—E. J. Pullinger.

Tunnicliff, Ruth, Howell, Katherine M., & Hirschberg, Nell. (1935). **Complement-Fixation and Opsonification Tests of Smooth and Rough Tubercle Bacilli with the Serum of Patients Suffering from Different Grades of Tuberculosis.**—*J. infect. Dis.* **56.** 111-115. 1 table. [1 ref.]

The technique used in carrying out the opsonic index test is given together with the technique employed in preparing the antigen for the complement-fixation tests.

Sera from 43 patients suffering from different forms of tuberculosis and in various stages of the disease were used. Results using smooth tubercle bacilli showed that the opsonic index test, although not always demonstrating the presence of tuberculosis, seemed to indicate the grade of infection while the complement-fixation test seemed to be specific for the diagnosis of tuberculosis, but appeared to give no indication of the grade of infection. Results using rough tubercle bacilli were unsatisfactory, only comparatively few sera producing any reaction at all.—P. L. Shanks.

Theiler, H., & Augustine, D. L. (1935). Zur Frage der immunbiologischen Diagnose der Trichinose. **[Diagnosis of Trichinosis by Precipitin and Intradermal Tests].**—*Zlb. Bakt. I.* (*Orig.*). **135.** 299-309. [Numerous refs.]

The authors of this paper review the literature and discuss the diagnosis of trichinosis with special reference to two recent papers by Maternowska [this *Bull.* **4.** 749.] and Trawinski and Maternowska [this *Bull.* **5.** 280]. They conclude that no reliance can be placed on the clinical manifestations of trichinosis, that all the ordinary clinical tests are liable to be misleading and that the only satisfactory means of diagnosis is the precipitin test or the intradermal test, when properly applied. They consider it very important for the intradermal reaction that not less than 0·1 c.c. of the diluted trichina antigen (1 : 10,000) should be injected into the superficial layer of the skin and that the reaction should appear

in 15 to 20 minutes. A positive reaction is obtainable three weeks after infection has taken place and accuracy may be expected in 90 per cent. of cases. A specific precipitin reaction does not appear until four or five weeks after infection.—E. L. T.

I. Pettersson, A. (1935). Ueber die natürliche Resistenz und die antibakterielle Immunität gegen die Oedembazillen. [**Natural and Anti-Bacterial Immunity against Gas Gangrene**].—*Wiss. Woche Frankfurt, 1934.* **3.** 123-126. 2 tables.

II. Albrecht, B. (1935). Gasödemgifte und Gegengifte und deren Wertbestimmung. (Ueber aktive Immunisierung gegen Gasödem). [**The Estimation of Strength and Standardization of Clostridium Toxins and Antitoxins**].—*Ibid.* 128-139.

I. Figures are recorded to show that when a mixture of leucocytes collected from an animal suffering from *Erysipelothrix rhusiopathiae* (swine erysipelas bacillus) infection, together with a lethal dose of that organism, is administered to a susceptible animal, it survives. Similarly, *Cl. histolyticum* plus sensitized leucocytes had no effect when inoculated into a susceptible animal, whereas an injection of that organism plus specific immune anti-bacterial serum was followed by death. [Specific antitoxin would, of course, have protected the recipient]. These experiments are used to illustrate the protective action of body cells.

II. Standardization of toxin and antitoxin is discussed. No new data are presented but the standard method of evaluating the reagents is reviewed, and the establishment of international standards is considered. Readers are referred to the original.—E. J. Pullinger.

Meyer, K., & Pic, A. (1935). Sur la nature des anticorps tuberculeux. [**The Nature of Tuberculous Antibodies**].—*C. R. Soc. Biol. Paris.* **120.** 772-774. 2 tables. [3 refs.]

It was shown by Meyer [(1912). *Z. ImmunForsch.* **15.** 245.] that specific antibodies can be produced in rabbits by the injection either of the lipoidal fraction (equivalent to Anderson's phosphatid A-3) or of the protein fraction of *Mycobact. tuberculosis.* Up to the present, it has proved impossible to determine whether the antibodies thus formed are identical or not. In the experiments reported in this article it is shown that, when an antilipoidal serum is absorbed with a lipoid antigen-kaolin complex, the corresponding antibody is removed, but that this does not occur with a protein-kaolin mixture. Conversely, an antiprotein serum can be absorbed by protein plus kaolin but not by the lipoid plus kaolin.—R. E. G.

Boivin, A., & Mesrobeanu, L. (1935). Recherches sur les antigènes somatiques et sur les endotoxines des bactéries. I. – Considérations générales et exposé des techniques utilisées. [**The Somatic Antigens and Endotoxins of Bacteria. I. Technique**].—*Rev. Immunol.* **1.** 553-569. 4 tables. [Numerous refs.]

A non-protein substance, which, it is suggested, may be the somatic antigen, has been extracted from various organisms, notably those of the coli-typhoid group. It consists essentially of a combination between a specific polysaccharide and a fatty acid, and is unstable.

The organisms, grown in any suitable liquid or solid medium, are suspended in distilled water after washing by centrifuging at high speeds (8,000 to 10,000 R.P.M.). An equal volume of an aqueous solution of trichloracetic acid is added and the tube is shaken up and stood for three hours in the cold. The mixture is then centrifuged to remove all organisms which retain their morphology and

Gram-staining reactions. The supernatant fluid is opalescent, due to the presence of the complete antigen in solution. To extract all the antigens from the bacteria, it is necessary to digest them with trypsin before adding the trichloracetic acid.

The complete antigen is antigenic on inoculation and can be used for precipitin tests, while its use in intradermal tests in man is suggested.

It is absolutely non-dialysable and can be purified by the use of nitro-cellulose membranes. Concentration can be effected over sulphuric acid, but precipitation by alcohol or acetone is more effective. The precipitate is dissolved in distilled water and all alcohol or acetone removed by dialysing against a large volume of distilled water.—A. W. Taylor.

## DISEASES, GENERAL.

Herrfarth. (1935). Wie lassen sich staatlich 1. die Tuberkulose, 2. die ansteckende Euterentzündung und 3. das seuchenhafte Verkalben der Rinder in einem Arbeitsgange und deshalb billig und erfolgversprechend bekämpfen ? [**Scheme for Simultaneous Control of Bovine Tuberculosis, Mastitis and *Brucella abortus* Infection**].—*Berl. tierärztl. Wschr.* **51.** 727-733. 1 table.

The author's proposals for the simultaneous eradication by the state of tuberculosis, mastitis and bovine contagious abortion include the following measures :–

In the course of four years all German cattle (excluding stall-fed animals and working oxen provided that they are segregated from breeding animals and milch-cows) would have come under the jurisdiction of the Animal Health Control Scheme. Each year provides for the inclusion of 25 per cent. of the total cow population. The number and species of all cattle would be ascertained by the mayor concerned and duplicate lists given to the competent veterinary authorities.

A short practical course should be held for all veterinary officers, and veterinary students should be especially trained in the methods used in the campaign against the diseases in question.

To each accredited veterinary officer certain districts would be allotted, taking into consideration the cattle population and the place of residence of the officer. All material necessary for his work would be supplied by the control office.

Owners should be present at the first examination and two helpers would be provided by the community at subsequent examinations. Not more than 100 animals should be examined by one veterinary officer in one day.

After all the usual prescribed tests had been carefully carried out in connexion with tuberculosis, mastitis and contagious abortion, form A (consisting of twenty columns dealing with the health of the herd) would be filled in by the veterinary officer and form B (giving particulars of the test carried out) by the control office. Each cow found to be suffering from open tuberculosis would be marked with a " T " on the left ear and could eventually be slaughtered. Cattle suffering from mastitis or contagious abortion would be sold for slaughter only after having been marked appropriately.

Breeding animals or milch-cows could be sold only when accompanied by a certificate (form C) stating that the animals in question were free from tuberculosis, contagious abortion and mastitis. This certificate would be valid for 14 days from the date of the clinical veterinary examination.

The cost of two half-yearly examinations would be borne by the state and of all other examinations by the owners, at a rate regulated by the state.—M. Burke.

Numans, J. M. G. (1935). Enkele gedeelten uit het statistich overzicht der geneeskundig behandelde paarden van het Koninklijk Nederlandsch-Indisch Leger over het jaar 1933. [**Horse Diseases. Statistics of the Military Veterinary Department, Dutch East Indies, for 1933**].—*Ned.-ind. Bl. Diergeneesk.* **47.** 201-214. 2 tables.

The hygiene and feeding of horses is discussed and figures are recorded of the losses sustained as a result of sickness and death. The causes of sporadic deaths are enumerated. Of the infectious or contagious diseases, only one case of glanders was noted between 1931 and 1933; there was also one case of anthrax. Very occasional cases of surra, tetanus and epizootic lymphangitis occurred. Since attention has been paid to the mineral and vitamin content of the diet, osteoporosis has not been encountered. Periodic ophthalmia was the commonest cause of illness. Over a ten-year period an average of 43 cases have occurred per annum with a loss of 1·5 per cent.—E. J. Pullinger.

Lovell, R., & Hughes, D. L. (1935). **Diseases of Young Calves: a Bacteriological Examination of 100 Cases.**—*J. comp. Path.* **48.** 267-284.

The authors examined 100 calf carcasses as soon after death as possible and hoped, by adequate bacteriological examination, to provide a classification of calf bacterial diseases on an aetiological basis. The following conditions were met with :–

(1) Infection with *Bact. coli* alone was responsible for 37 deaths, the disease being of the nature of " white scours ". The organism was isolated in the majority of cases from the blood, spleen and bone-marrow, in addition to other sites, thus indicating the septicaemic nature of the disease.

(2) Infection with *Corynebact. pyogenes* alone accounted for 12 cases, the *post-mortem* lesions consisting mainly of consolidation of lungs, with areas of necrosis and suppuration, and a fibrinous pleurisy.

(3) A haemolytic coccobacillus, similar to " *B. bovisepticus*, Group 1 of Jones ", was apparently responsible for six deaths, producing a lobular consolidation of the lungs at *post-mortem* examination. The authors discuss the possible relationship of this organism to *Pasteurella.*

(4) *Salmonella typhi-murium* was the only apparent pathogen isolated from two cases.

(5) *Pasteurella* was isolated alone from one case.

(6) Mixed infections accounted for 11 cases. Two or more of the following pathogens were found in these cases, *i.e. Bact. coli* in six, *C. pyogenes* in five, *Pasteurella* in five, *Pseudomonas pyocyanea* in three, haemolytic coccobacillus in two and *Staphylococcus aureus* in two.

The remaining cases were not classified, as the causes of death were variable. The general results should serve as a useful basis for further investigation.
—F. C. Minett.

Poisson, H., & Rasamoelina. (1935). Au sujet des calculs biliaires du boeuf et du porc à Madagascar. [**Biliary Calculi in Cattle and Swine in Madagascar**]. —*Bull. Soc. Path. exot.* **28.** 774-775.

Biliary calculi are frequently encountered in cattle and swine slaughtered at abattoirs. They are usually found in the gall-bladder, and more rarely in the bile ducts. It is the infection of these ducts which is the immediate cause of the formation of calculi.

The method of formation is indicated, and a description given of two types of calculi. The liver is always found to be cirrhotic in affected swine.—F. H. Manley.

I. Oxspring, G. E. (1935). **The Radiology of Navicular Disease, with Observations on its Pathology.**—*Vet. Rec.* **15.** 1433-1447. 21 text figs., 8 figs. on 2 plates. [4 refs.]

II. —. (1935). **The Radiology of Navicular Disease.**—*Ibid.* 1447.

I. This is a valuable account of the radiological diagnosis (excluding details of X-ray physics) and pathology of navicular disease, 128 feet from horses suffering from navicular disease having been examined during life and after death.

Two important discoveries, the method of filling the clefts of the frog with a paste consisting of finely divided hoof parings in lard to eliminate undesirable shadows in the photographs, etc., and the use of the Lysholm grid to prevent scattering of the X-rays (in conjunction of course with an intensifying fluorescent screen), have proved of great success in radiological diagnosis, even in the early stages of the disease.

The author is convinced that trauma is the exciting cause of navicular disease: this causes congestion of the foot in which the navicular bone participates. The disease starts in the bone itself and not in its fibro-cartilage, nor in the deep flexor tendon, but these structures are involved secondarily and in turn. The bone lesion is an osteoporosis, which may be localized as a sharply defined pit or may be diffuse. Exostoses sometimes develop at the posterior border and extremities of the bone, the latter constituting the so-called " spurs " seen in X-ray negatives, which are diagnostic of navicular disease, though not always present.

As a result of this work it is now possible to diagnose navicular disease much earlier than before, and affected horses can be cast sooner, with much saving in expense.

II. An editorial commending this advance in the use of radiology in veterinary science.—J. E.

I. Mitchell, W. M. (1935). **The Problem of " Rheumatic Disease " (Osteo-Arthritic and Allied Conditions) in the Horse.**—*Vet. Rec.* **15.** 1501-1507. 1 table. [8 refs.]

II. —. (1935). **Equine Skeletal " Unsoundness ".**—*Ibid.* 1517.

I. In the course of a lengthy series of *post-mortem* examinations of horses of all ages, the author has been impressed by the frequency of structural changes in various parts of the body, notably in bones, joints and peripheral nerves. The changes in question are those of an osteo-arthritic nature such as " spavins ", " splints ", etc., and also neuritis as represented by such diverse conditions as shivering, roaring, etc. The author suspects that there exists a single aetiological factor accounting for the whole process and, in the absence of a better one, suggests the name " rheumatic disease " for the condition.

The first part of this paper is a review of the forms in which " rheumatic disease " shows itself in the ante- and post-natal life of foals and in adult life in horses: the remainder is devoted to an examination of the possible causes. The author condemns in its entirety the theory of the hereditary nature of these lesions. He thinks that the true cause may lie in some nutritional factor such as mineral imbalance or avitaminosis. The question of the excess of phosphorus over calcium in diet is examined and also possible deficiencies of vitamins A, C and D. He finds a deficiency of vitamin A most likely to be responsible for this disease.

II. This is a commentary on the above paper. It is pointed out that unsoundness of this nature is the most common disease of horses in the United Kingdom to-day and that knowledge of the aetiology, diagnosis and treatment of the various forms of equine unsoundness is not advancing in a manner commensurate with developments in other fields of veterinary science.—C. Davenport.

Drennan, A. M. (1935). **The Pathology of Osseous Tissue.**—*Brit. med. J.* Dec. 28th. 1241-1245. [39 refs.]

The pathology of osseous tissues differs from that of ordinary connective tissue on account of its hardness : this is dependent upon the calcium content of bone and thus upon the factors which influence calcium metabolism.

The author inclines to the view that osteogenesis is the function of a specific cell, the osteoblast, although he admits that fibroblasts may occasionally be capable of building bone in unusual circumstances.

The relation between osteitis fibrosa and the parathyroids is considered to be clearly established although the size of these glands (as is the case with the thyroid) is not of necessity proportional to their functional activity. The excessive formation of osteoid tissue in this disease is in the nature of a compensatory reaction : removal of calcium resulting in decreased mechanical support necessitates increased bulk to give the required rigidity.

The more rarely occurring tumours of bone are discussed.—E. G. White.

Mócsy, J. (1935). Vizsgálatok a haemoglobin és a myoglobin kiürüléséről a veséken át. [**Excretion of Haemoglobin and Myoglobin through the Kidneys**].—*Allatorv. Lapok.* **58.** 190-194.

Comparative experimental studies on the quantitative excretion of myglobin and haemoglobin showed that myoglobin, if introduced in even the smallest quantities into the blood stream, is almost completely eliminated through the kidneys within a short time. The renal threshold for haemoglobin has been reached in horses if the 1/20th to 1/30th part of the total blood haemoglobin content passes into the blood plasma : the myoglobin threshold proved to be about 40 times lower. Strictly speaking, no renal threshold exists for myoglobin and this circumstance accounts for the prompt excretion of the smallest quantities of myoglobin released from the muscles in cases of paralytic myoglobinuria. The explanation of this phenomenon may be found in the chemical composition of myoglobin and in the elective secretory capacity of the kidneys, rather than in the stimulating effect of an alleged muscle substance introduced into the blood together with myoglobin.—A. Kotlán (Budapest).

Hetzel, H. (1935). Die Hyperplasia glandularis cystica endometrii bei den Fleischfressern. [**Cystic Endometritis in Carnivora**].—*Wien. tierärztl. Mschr.* **22.** 609-622. 4 figs. [14 refs.]

The author considers that many cases previously considered to be pyometra would be termed glandular cystic hyperplasia in human gynaecology. Affected animals dealt with by the author were either old (eight years and over) or under one year. They were either virgin or, more frequently, had been mated but failed to conceive. In the rare cases met with in parous bitches the gestation had occurred two or three years previously. Symptoms always followed oestrus which had been fruitless, never being met with shortly after parturition.

The disease is divided into acute and chronic forms and, as complications, there may be either septic endometritis (seldom met with but often fatal), chronic purulent metritis or pyometra.

From histological studies, it is considered that the condition of glandular hyperplasia is a continuous stage of proliferation of the uterus and ovaries which, owing probably to hormonal disturbances, fails to regress and give rise to the normal resting phase. One case showed two cysts in the anterior lobe of the pituitary. The fact that many animals are not allowed to become pregnant is considered to be an important predisposing factor.

In two experimental animals, a degree of glandular hyperplasia was produced by the administration of oestrin preparations. Treatment of uncomplicated cases with extracts of the anterior pituitary followed by corpus luteum hormone is recommended. Complications are best treated by hysterectomy.—E. G. WHITE.

MAYERHOFER, V. (1935). Beitrag zur Fibrinösen Serosen- und Gelenksentzündung der Ferkel. [**Fibrinous Inflammation of Serous Membranes and Joints in Piglets**].—*Wien. tierärztl. Mschr.* **22.** 634-635.

In 15 piglets found to be affected with a fibrinous inflammation of the serous membranes and joints, all the animals were between the ages of five and 12 weeks. All except two had travelled long distances by road or rail prior to becoming affected, the first symptoms of lameness appearing five days after the journey.

In addition to the usual changes in the serous membranes, joints, lungs and alimentary tract, the author found increased amounts of fluid in the cerebral ventricles, the fluid being cloudy in appearance. In six animals, an organism called by previous workers the " serosa bacillus " was isolated from the serous cavities and joints, cerebral ventricular fluid (four cases) and liver (one case), but never from the spleen, kidneys or blood. This organism is Gram-negative and not acid-fast ; it grows on agar only when serum or blood is present and even then but slowly. Of the remaining animals, no cultures were obtained from five, while the rest showed the presence of *Bact. coli.*

Attempts to transmit the disease to two piglets by subcutaneous inoculation of material containing the " serosa bacillus " were unsuccessful.—E. G. WHITE.

FAHR, H. O. (1935). Die " Arteriosklerose " beim Haushuhn. [**Arteriosclerosis of the Domestic Fowl**].—*Inaug. Diss., Giessen.* pp. 33. 5 figs. on 5 plates. [Numerous refs.]

The first part of the paper reviews comprehensively the literature concerning vascular changes in birds, with special reference to those involving deposition of fatty substances and calcium.

Macroscopic and histological examination was carried out on 135 fowls of varied ages (two hours to ten years) and comprising many breeds, the birds having succumbed to a variety of diseases. After discussing the structure of the normal aorta in the chick and adult bird, the pathological changes found are considered. From a critical study of the histological findings it is considered that the terms arteriosclerosis and atherosclerosis are applicable to the conditions described. Two distinct processes – lipoid infiltration and sclerosis – were found to exist and, in the former, the fatty substances were mainly isotropic in nature, the anisotropic type being absent, or at any rate present in very small amounts. Cholesterol crystals were seldom found. The degree of fatty change did not tend to be higher in older birds : there was sometimes marked infiltration in young chicks. In an attempt to induce vascular lesions, five hens were fed on a diet consisting of 50 g. each of barley and oats and one egg yolk daily which was emulsified in water and given by a tube. The control received the same corn ration but no egg. All the birds showed the changes described above, but they were more severe in the control than in those given egg. The histological and macroscopic lesions are clearly illustrated by the plates.—E. G. WHITE.

[redacted]

HÖFLIGER, H. (1935). Ueber angeborene allgemeine Wassersucht bei Tieren. [**Congenital General Dropsy in Animals**].—*Schweiz. Arch. Tierheilk.* **77.** 447-462 and 517-528. 4 figs. [Numerous refs.]

In the first part of the paper a review of the literature is followed by an account

of two cases examined. The first was a case of twin calves while the second was a kid, both cases being fully recorded with history, *post-mortem* findings and histological reports. In the second and final part of the paper there is a full report of a third case of congenital anasarca in a calf.

All three cases showed marked oedematous infiltration of the subcutaneous and intramuscular tissues and of the interstitial tissues of various organs, accompanied by dropsy of the foetal membranes in one case which was the only one in which data were available on the latter point.

The aetiology of the condition was in one case found to be in an obstruction of the circulation due to developmental errors and the occurrence of abnormality of the central nervous system. In the other two cases there existed no anatomical derangement which could be considered to be the cause of the condition. In all three cases the thyroid glands were normal.—E. G. White.

Selye, H., Collip, J. B., & Thomson, D. L. (1935). **Some Interrelations between Water and Fat Metabolism in Relation to Disturbed Liver Function.**—*Lancet.* **229.** 297-298. 1 table. [1 ref.]

Intravenous injection of large quantities of saline into rats immediately after partial hepatectomy caused fatty degeneration of the liver accompanied by ascites and oedema 24 hours later. These changes were not observed following similar injection of normal rats, nor after partial hepatectomy or nephrectomy, nor 48 hours after partial hepatectomy. If the rats were bled after partial removal of the liver, fatty changes occurred 24 hours later. Conspicuous fatty changes of the liver remnants were in evidence if drinking water was withheld after incomplete hepatectomy, but not if the hypophyses or adrenals of the rats had previously been removed. These experiments afford evidence of the interrelationships between fat and water metabolism and the effect of hormones upon them.—Alfred Eden.

Adsersen, V. (1935). Smitsom hønselammelse (Neurolymphomatosis gallinarum). [**Fowl Paralysis**].—*Medlemsbl. danske Dyrlaegeforen.* **18.** 475-485, 507-518 and 554-571. 8 figs. on 4 plates. [24 refs.]

An account is given of the literature and present views on this disease. The author has in the past year found typical cases of fowl paralysis in 22 flocks from different parts of Denmark. Eight flocks were seriously affected with a high mortality. In many cases it seemed as if the sale of brood eggs and day-old chicks was responsible for the spread of the disease. In other cases the source of infection was not obvious. The description of the clinical symptoms and findings is quite typical of the disease as seen elsewhere. The disease is possibly wide-spread in Denmark.—H. C. Bendixen (Copenhagen).

Emmel, M. W. (1935). **The Etiology of Fowl Paralysis, Leukemia and Allied Conditions in Animals. I. Introduction. History and a Bacterial Theory of the Etiology of These Diseases. II. The Intravenous Injection of Suspensions of *Salmonella aertrycke* in the Chicken.**—*Bull. Fla agric. Exp. Sta.* No. 284. pp. 59. 11 tables. [Numerous refs.]

The author states that this is the first of a series of papers in which it is intended to show that :– (1) in most instances the same aetiological agent is responsible for fowl paralysis, leucaemia in its various forms and other allied conditions in the fowl ; (2) the primary aetiological agent is non-specific in that it may be any one of a number of members of the paratyphoid or typhoid groups ; (3) enteritis, most commonly caused by intestinal parasites, is most often a predisposing factor in the fowl ; (4) cases of fowl paralysis, leucaemia and allied conditions

so induced are comparable to naturally occurring cases, and (5) organisms of the paratyphoid and typhoid groups are also capable of inducing leucaemia and allied conditions in other animals.

He says that members of these groups of organisms may be isolated from the intestinal tracts of fowls in cases of enteritis and occasionally in extremely acute cases of paralysis, and it is his contention that enteritis provides an avenue for the entrance of infection which passes into the blood stream and induces haemocytoblastosis. This condition is then maintained for some time by the infection but eventually progresses under an impetus which is apparently gained by the formation of some toxic substances in the blood stream ; the author considers that this substance has been mistaken by other investigators for a filtrable virus.

In the second part of the paper an account is given of experiments in the intravenous injection of cultures of *S. aertrycke* into birds of varying ages. The reason given for selecting *S. aertrycke* is that it has been observed more frequently than other members of the groups in naturally occurring cases of fowl paralysis.

In one of the experiments the birds used were day-old chicks ; all of these died within a week. In the remaining experiments the ages of the birds ranged from 12 to 20 weeks, except that in one experiment the age was 12 months.

Altogether 122 birds, other than day-old chicks, were used, and of these 30 developed fowl paralysis, 73 showed the presence of immature cells in the peripheral blood (haemocytoblastosis) and the majority of the remainder showed some change in the blood picture.

The birds used as controls in the various experiments all remained normal.
—W. J. Ironside.

Thomas, J. C., & Hamilton, H. P. (1935). **Fowl Paralysis : an Analysis of One Thousand Cases.**—*Vet. J.* **91.** 526-536. 4 figs., 9 tables. [2 refs.]

A statistical analysis is given of 1,017 cases of fowl paralysis out of a total of 8,139 autopsies performed during the period from July, 1934, to June, 1935. The main part of the paper deals with those cases in which the diagnosis of fowl paralysis was confirmed histologically and full *post-mortem* reports were available.

The highest incidence of the disease was found to be during the summer, at a time when the birds hatched in the spring of that year were commencing to lay.

There was no evidence that parasitic infestations play any part in the aetiology of the disease.

In 6·8 per cent. of the cases a diagnosis was reached only after histological examination of the tissues, as no macroscopic lesions were present. Since an enlarged nerve is not diagnostic of the disease nor absence of such enlargement sufficient to exclude it, the authors appeal for standardization of *post-mortem* technique and histological diagnosis.

The brachial and sciatic plexuses showed a higher incidence of lymphoid infiltration (45 per cent.) than other nerves.

Details of the influence of breed, distribution of lesions, concurrent diseases, etc., are summarized in diagrams and tables.—E. G. White.

I. Marek, J., & Wellmann, O. (1935). Mangelkrankheiten. [**Deficiency Diseases**].—*12th Int. vet. Congr. 1934.* **3.** 450-473. [English, French and Spanish summaries : abst. from orig. in German].

II. Hart, G. H. (1935). **Deficiency Diseases.**—*Ibid.* 473-487. [French, German and Spanish summaries].

I. This paper is entirely concerned with vitamin-deficiency diseases. It is shown how interrelationships exist between vitamins and hormones and how the

mineral composition of the diet may affect the mechanism of vitamin action in the body. The characteristic symptoms of avitaminosis-A in fowls which have been on a diet lacking in green foodstuffs are described ; they are said to resemble those of enzootic coryza and to be associated with keratomalacia and xerophthalmia. Avitaminosis-B also occurs mainly in fowls, polyneuritic phenomena accompanied by emaciation and lameness being usually the first symptoms observable. Cases of scurvy or avitaminosis-C in dogs are described in which the chief symptoms were ulceration of the gums, loosening of teeth and osteoporotic changes similar to that seen in Barlow's disease of young chickens [see comment on article by COLLET, below]. The rachitis, osteomalacia and spasmophilia which occur in cases of vitamin-D deficiency are shown to be largely dependent upon the calcium and phosphorus content of the diet. Spontaneous avitaminosis-E has not been observed, probably owing to the wide distribution of the vitamin in foodstuffs, but in cases of vitamin-E deficiency the chief symptoms are sterility and a large decrease in milk production.

II. It is emphasized that imperfect nutrition, with its varied manifestations, is an important aetiological factor in many diseases which are wide-spread and occasion much loss to stockowners. The author submits that the essentials of a complete diet are carbohydrates, fats, proteins, vitamins, minerals and water. Deficiency of even one of these components often leads to gross pathological conditions. This paper is chiefly concerned with the effects of mineral and vitamin deficiency, the important mineral deficiencies discussed being those of phosphorus, calcium, iron, copper and iodine, whilst the symptoms of avitaminosis A, B, B2, C, D and E are all described. [Original papers describing these deficiency diseases in full detail have already been abstracted in this *Bulletin*].—J. STEWART.

COLLET, P. (1935). La maladie de Barlow spontanée chez le chien (Scorbut infantile). **[Scurvy in Dogs].**—*Rev. vét., Toulouse.* **87.** 497-537. 1 plate. [Numerous refs.]

In this paper the author describes two cases of a naturally occurring condition in young dogs which he asserts to be scurvy, comparing it exactly to Barlow's disease in young children. The principal clinical symptoms were a slight anaemia, a swelling of the jaws and signs of " pseudo-paralysis " of the legs. Both animals recovered on the addition to the diet of lemon-juice in one case and orange-juice in the other. When the antiscorbutic treatment was withheld, the second dog again became affected and died. Histological examination of the bones of this dog apparently confirmed the author's view that the condition was that of scurvy, as it agreed very closely with the description of MAREK and WELLMANN for scurvy in pigs [see previous abstract].

[The above paper is interesting as the existence of naturally acquired scurvy has not been positively proved in the case of dogs, although many authors have recorded cases considered to be scurvy but without adequate evidence of confirmation as the pathological descriptions of the cases have not been very detailed.

INNES. (1931). *Second Rep. Direct. Inst. Anim. Path. Univ. Cambridge.* p. 143, has shown that dogs can be kept 154 days on a scurvy-producing diet without any signs of ill-health or the slightest trace of the production of lesions in the bones, and also that dogs appear to be capable of synthesizing vitamin C. It is, therefore, doubtful if we can accept a diagnosis of scurvy purely on the grounds that feeding well-known antiscorbutics cleared up the condition. Further, no attempt was made to produce the disease in normal dogs by subjecting them to the same living and dietary conditions as was known to produce the symptoms detailed in the above cases].—JAMES STEWART.

Lormore, R. E. (1934). **Acetonemia in Dairy Cows.**—*Vet. Med.* **29.** 474-476. 3 tables, 1 photograph.

Acetonaemia, formerly confused with milk-fever on account of allied symptoms, is due to incomplete fat oxidation in the body influenced by an impaired carbohydrate metabolism. It is characterized by hypoglycaemia and a marked increase of " acetone bodies " in the blood and urine. A case is reported of a high-yielding dairy cow which was treated by intravenous injections of glucose plus feeding of molasses ; in a fortnight the blood sugar level had risen and the acetone bodies fallen almost to normal. A simple test is given for the rapid diagnosis of acetonuria.
—Alfred Eden.

I. Boddie, G. F. (1935). **Some Aspects of Ketosis in Dairy Cows.**—*Vet. Rec.* **15.** 1539-1546. 5 tables. [20 refs.]

II. —. (1935). **Blood and Urine Analysis in Disease.**—*Ibid.* 1546.

I. In this article the author gives the results of blood sugar and blood ketone determinations in eight normal cattle. Successive determinations were made at intervals throughout the winter and spring months, and in some cases the period of parturition was included in the course of the investigation. Figures are given of the blood sugar and blood ketone values in three cases of post-parturient dyspepsia (two mild and one severe). Urine ketone values for 16 normal cows and one case of post-parturient dyspepsia, and the blood and urine ketone values in a case of post-parturient haemoglobinuria are also given.

Following parturition no reduction was observed in the amount of blood sugar in the normal cow and only minor increases occurred in the amount of blood ketones. In cases of post-parturient dyspepsia there was a pronounced drop in blood sugar and a substantial increase in blood ketones, the increase being principally in the amount of diacetic acid.

A survey of the literature on the subject is given.

II. In this editorial article comment is made on I and on the use of biochemical methods in veterinary medicine.—A. Robertson.

Lesbouyries, Berthelon, & Lomer. (1935). Rapport sur quelques recherches biochimiques dans le sérum sanguin de vaches atteintes de fièvre vitulaire. **[The Chemical Composition of the Blood of Cows with Milk Fever].**—*Bull. Soc. vet. prat. Fr.* **19.** 166-179. 2 tables. [1 ref.]

This paper forms a study of the amounts of Ca and Mg in the blood of normal cows and those suffering from milk fever. It is concluded that hypocalcaemia is not an indispensable sign of milk fever, and that convalescence is not always accompanied by a rise in the blood Ca. These conclusions are based on the examination of the blood from one cow in each case. The Mg content of the blood in milk fever is variable.—Henry Dryerre.

I. Toman, R. V. (1934). De positieve alcoholproef bij melkvee als afwijking en als hulpmiddel voor de diagnostiek van grastetanie. [**Positive Alcohol Test of Milk as an Indication of Incipient Grass Tetany**].—*Tijdschr. Diergeneesk.* **61.** 965-968. [English, French and German summaries : abst. from orig.]

II. Sjollema, B., & Seekles, L. (1934). Untersuchungen über die Aetiologie der Grastetanie. IV. Mitteilung. Versuche über die allergische Reaktion der Haut bei Rindern und über Sensibilisierung von Kaninchen gegenüber den eiweissfreien Bestandteilen des jungen Grases. **[The Aetiology of Grass Tetany. IV].**—*Arch. wiss. prakt. Tierheilk.* **68.** 215-216. [3 refs.]

III. Seekles, L., & Sjollema, A. (1935). Untersuchungen über die Aetiologie

der Grastetanie. V. Mitteilung. Zur Frage der Herabsetzung des Calcium- und Magnesiumgehaltes im Blute durch einen Faktor aus Vegetabilien, sowie durch Blutentnahme, Fasten und Gewebenekrose. [**The Aetiology of Grass Tetany. V. The Lowering of the Blood Calcium and Magnesium by a Plant Extract, by Blood Loss, Fasting or Tissue Necrosis**].—*Ibid.* 386-396. 2 tables. [12 refs.] [For abst. of previous articles in this series, see this *Bull.* **3.** 559 and 560].

IV. Lockau, U. (1935). Ueber die Ursachen von Milchfieber, Reisefieber und Weidetetanie. [**Causes of Milk Fever, Transit and Grass Tetany**].—*Berl. tierärztl. Wschr.* **51.** 353-355. [13 refs.]

I. It is stated that the milk of cows in the very early stages of grass tetany has a high acid content and curdles rapidly when subjected to the standard alcohol test. It is thought that this test, which is easily applied, might be used to identify incipient cases of grass tetany.

II. An attempt to identify bovine grass tetany as an atopic reaction [*e.g.* pollen sensitization] to certain extracts of grasses was unsuccessful.

III. The authors failed to produce specific changes in the blood calcium level by the injection of extracts of certain grasses. A certain degree of non-specific change of level followed the various processes mentioned in the title.

IV. The causes and treatment of these conditions are discussed. No new information is presented.—E. J. Pullinger.

Stewart, W. L., & Piercy, S. E. (1935). **Border Pining in Sheep. – I.**—*J. comp. Path.* **48.** 157-190. 6 tables. [28 refs.]

The authors define " Northumbrian pining " as a chronic wasting disease of hill sheep, characterized by anaemia and emaciation. In the higher grazing areas, a form of " pining " occurs which is of obscure causation. On lower lying farms, the term " pine " is applied to a condition in lambs which occurs during the summer and autumn months. This condition is probably due to gastro-intestinal parasites, and the authors have been struck by the similarity of the symptoms exhibited by both forms.

It is suggested that a similar disease known as " blood rot " represents a haemonchosis, while it is claimed that a condition named " saut " probably also results from a worm infestation. The disease was set up experimentally by confining sheep to " pining " land, and a careful study was carried out on numerous cases both of the naturally occurring and experimentally produced disease. The haemoglobin content of the blood and the number of red cells were both reduced to figures approximating 50 per cent. of the normal. Since the colour index thus remained unaltered and since aberrant types of red cells were only rarely observed, the blood picture presented a sharp contrast to that described by Fourie in haemonchosis [this *Bull.* **2.** 158]. Differential leucocyte counts corresponded with those found associated with heavy helminth infestation and faecal examinations revealed the presence of ova of trichostrongyle worms in the majority of sheep examined.

No definite conclusions as to the nature of the disease appear to have been reached but, in the opinion of the authors, it is yet " unjustifiable to link pining with the so-called deficiency diseases ", *e.g.* " bush sickness ", " Nakuruitis ", " salt sick " and " Tiree pine ", and they apparently suggest that such conditions may be due to a primary helminth infestation.—J. R. Greig.

Cruickshank, Ethel M. (1935). **Vitamins and Minerals in Poultry Nutrition.**—*Nutr. Abstr. Rev.* **5.** 1-20. [Numerous refs.]

This review is divided broadly into two parts, one on the role of vitamins and the other on that of minerals in poultry nutrition. Symptoms of avitaminosis-A are dealt with. The vitamin A requirements for growth and for egg production have been variously worked out. Vitamin D deficiency produces a rachitic-like effect, apparently more closely allied to osteoporosis, and this deficiency has been linked up with histological changes in the thyroid and parathyroid, with the calcium and phosphorus content of the blood and with bone composition. The vitamin D requirements are relatively high and hypervitaminosis-D is very difficult to induce, especially in laying birds. The actual requirements of the B complex are unknown ; fowls are apparently able to synthesize vitamin C, and the influence of vitamin E is uncertain.

The needs of calcium and phosphorus for the growth and reproduction of the fowl are discussed ; an unsuitable calcium : phosphorus ratio, especially with excessive amounts of minerals, is associated with a bone abnormality, perosis, and the calcium and phosphorus metabolism is upset by magnesium intake. There is a definite requirement of iodine, iron, copper and sodium (as the chloride), but fluorine is toxic in more than small quantities.—Alfred Eden.

Seifried, O. (1935). Neuere Forschungsergebnisse auf dem Gebiete der Tier-avitaminosen. [**Recent Work on Avitaminosis in Animals**].—*Dtsch. tierärztl. Wschr.* **43.** 497-504 and 519-521. 9 figs., 1 table. [Numerous refs.]

The significance of vitamins in the health of domestic animals is discussed. The water-soluble vitamin $B_1$ (antineuritic vitamin) is found in a wide assortment of plants, in milk, meat and in eggs. Natural deficiency is rare amongst domestic animals ; it is accompanied by loss of appetite, maldevelopment and, in extreme cases, polyneuritis. Water-soluble $B_2$ (anti-pellagra vitamin) is found in plants, milk, meat and eggs. Deficiency may produce dermatitis or necrosis of the skin of dogs with abnormal pigmentation. An experimental form of sprue may be produced with associated anaemia ; degenerative changes in the central nervous system may also occur. Water-soluble and alkali-stable vitamins $B_3$, $B_4$ and $B_5$ come from the same sources and are concerned with growth. Water-soluble vitamin C (anti-scorbutic vitamin) occurs chiefly in certain fruits and plants and also in milk. In those animals which cannot synthesize the vitamin, deficiency results in scurvy with certain associated symptoms such as gingivitis. Except for experimental cases, this type of deficiency is rare amongst domestic animals. Deficiency of the water-soluble vitamin H causes seborrhoea. This vitamin is found in plants, meat and milk.

Fat-soluble vitamin A (anti-xerophthalmic vitamin) occurs in most animal and vegetable fats. Apart from experimental deficiency, lack of this vitamin causes a spontaneous disease in fowls simulating contagious coryza and in certain circumstances resembling fowl paralysis and verminous infestation. The pathological changes of this deficiency condition are described in detail. [It has also been shown that pigs on a fattening ration may suffer from vitamin A deficiency. Normally such pigs are slaughtered before symptoms have had time to appear]. Fat-soluble vitamin D (anti-rachitic vitamin) is found in meat, milk, eggs and animal and vegetable oils. The vitamin can be synthesized by the ultra-violet irradiation of a cholesterol-like precursor. This vitamin influences the construction of normal bone and deficiency results in the onset of rickets. Fat-soluble vitamin E (anti-sterility vitamin) occurs in certain animal glands, lard, egg-yolk, the germinal cell of grain and elsewhere. Deficiency upsets the sexual function. In the male, production of spermatozoa is in abeyance and the testicles degenerate ; in the female ovulation takes place but the embryo degenerates shortly after conception.

This vitamin may also influence milk production and, in extreme cases of deficiency, lameness and paralysis may result. [From the foregoing survey it is clear that vitamin deficiency is a far less important factor amongst domestic animals than amongst human beings. Apart from vitamin A deficiency amongst fowls, no spontaneous disease is known to occur which is comparable in economic importance to beri-beri, pellagra, scurvy or rickets. This lack of importance is partly because the ordinary food generally given to animals contains a sufficiency of vitamin. Even if vitamin is lacking at one time of the year, at another season it will be present in abundance. Another reason is that animals may be slaughtered for food before signs of avitaminosis appear. Apart, however, from such explanations, certain animals seem to thrive on an absolute minimum vitamin intake such as would never be encountered under natural conditions. Thus THEILER and his co-workers fed cattle for 13 months solely on polished rice and autoclaved hay without producing symptoms of deficiency ; in another experiment they showed that cows could produce calves and milk when existing upon the amount of vitamin to be found in a daily ration of 3 lb. of poor hay. In both experiments there was a suggestion that calves so produced were not entirely normal. It should be remembered that THEILER's experiments were carried out in an abundance of sunshine].—E. J. PULLINGER.

## PUBLIC HEALTH.

I. SPIEGL, A. (1935). Die Durchführung der bakteriologischen Fleischuntersuchungen nach den in Preussen geltenden neuen Bestimmungen und die dabei gemachten Erfahrungen. [**Bacteriological Meat Control in Prussia**]. —*Z. Fleisch- u. Milchhyg.* **46.** 1-5. 2 tables.

II. KRÜGER, H. (1935). Die Typendiagnose bei der bakteriologischen Fleischuntersuchung. [**Bacteriological Differentiation of Species in Meat Inspection**].—*Berl. tierärztl. Wschr.* **51.** 657-660.

I. A record is given of the bacteriological examination of material from 977 animals slaughtered for food. Methods of taking samples, and types of enrichment media and selective media are discussed. Food-poisoning organisms belonging to the genus *Salmonella* were isolated from cows and calves showing a variety of lesions such as focal necrosis, metritis, pneumonia and inflammation of serous membranes and of the alimentary tract. Similar organisms were also isolated from material showing no pathological changes.

II. In connexion with meat inspection, the writer discusses the biochemical and serological differential diagnosis of salmonella organisms capable of causing food poisoning. No new methods are advocated. Organisms falling in this category have been isolated from cases of equine colic, bovine metritis, mastitis, enteritis and pneumonia, and from calves with joint infections. Similar organisms were also isolated from pigs.—E. J. PULLINGER.

FOOTNER, W. A. (1934). **The Inspection and Preparation of Meat for Export and Slaughter of Cattle by means of Electricity.**—*S. Afr. med. J.* **8.** 917-924. [13 refs.]

This paper gives a description of the methods used at the abattoir in Durban for export cattle. After describing the procedure in the case of frozen beef, that involved in the chilling process is considered in detail. A description is given of a special collar used in the electrocution of cattle at the abattoir. After receiving a cold shower, the collar is adjusted to the animal's neck and a shock of 160 volts

A.C. is given, the current remaining on for 30 seconds. This method of slaughter is humane and excellent bleeding is obtained, resulting in better keeping properties of the meat.—E. M. Robinson.

Thorpe, G. K. (1934). **Notes on Australian Chilled Beef.**—*Aust. vet. J.* **10.** 219-222.

Although beef, when frozen, withstands storage for long periods without appreciable impairment of its nutritive and edible qualities, it suffers commercial depreciation owing to exsiccation, discoloration, mould and " drip ". At chilling temperatures, *i.e.* about 30°F., beef can be kept without deterioration for about 40 days and this period can be extended to 48 days if great care is taken to avoid bacterial contamination. An atmosphere of 10 per cent. carbon dioxide enables chilled beef to be kept much longer, and with this process chilled beef is now successfully transported from Australia to England.—W. I. B. Beveridge.

Newitt, A. W., Glassen, Jean W., & Pryer, R. W. (1935). **An Outbreak of Milk-Borne Hemolytic Streptococcic Infection.**—*Amer. J. publ. Hlth.* **25.** 804-812. 4 figs., 6 tables. [9 refs.]

An outbreak of severe sore throat was investigated by the Michigan Department of Health. 186 cases occurred among a population of 700 persons. Milk from one source was a common factor in 175 of the cases and one cow with mastitis was found to be excreting haemolytic streptococci similar to those recovered from throat swabs. The authors traced the outbreak to the one cow and observed that the condition differed materially from scarlet fever. They suggest that the cow was infected with a haemolytic streptococcus of human origin, possibly a scarlet fever organism modified in its new host, and that " hemolytic streptococci associated with scarlet fever, erysipelas, and septic sore throat may well be variables rather than fixed strains deserving separate classifications ".—H. T. Matthews.

I. Cowan, S. T., & Maddocks, L. (1935). **The Value of a Cytological Examination of Milk for the Detection of** *Mycobacterium tuberculosis*.—*J. Path. Bact.* **41.** 373-383. 4 figs. on 2 plates, 3 tables. [12 refs.]

II. —. (1936). **The Cytological Examination of Milk.**—*Lancet.* **230.** 93-94. [3 refs.]

I. The authors carried out microscopic examinations on samples of milk, from single cows, sent in to the Manchester public health laboratory. The technique is detailed and a description given of the cellular aggregations observed ; they are classified into seven types, of which those composed of endothelioid cells are thought to be indicative of an udder infection. The types deemed significant are illustrated in colour. A series of 229 samples, of which 38 were tuberculous, was examined and the results are analysed. The main conclusion is that observation of endothelioid cell groups facilitates the demonstration of acid-fast bacilli which may with confidence be reported as *M. tuberculosis*. Laboratory workers in this field should consult the original article. [See also this *Bull.* **4.** 305 and **5.** 648].

II. This is an annotation of I.—H. T. Matthews.

Pariscot, J., Melnotte, P., & Fernier, L. (1934). **Milk Hygiene in the Department of Meurthe-et-Moselle.**—*Quart. Bull. Hlth Org. L.o.N.* **3.** 662-729. 5 plates, 6 tables, 4 charts.

This is a somewhat involved survey of the state of the milk supply in one department situated in the north-east of France. Many factors affecting production, distribution and consumption are noted in detail.

The majority of the farms are small holdings and, with the exception of those in the rebuilt devastated area, are insanitary in several respects. Adequate water supply is often lacking or grossly polluted. Of diseases among the cattle, a mild form of foot and mouth disease is endemic, anthrax is rare and reactors to the tuberculin test average 6·2 per cent. *Brucella melitensis* infection distinguished from *Br. abortus*, is regarded as a new danger.

Rather more than half of the urban milk supply is sold raw, the remainder being industrially treated. Consumption per head of the population is low and the greatest demand is for semi-skimmed milk. A standard of " commercial " quality only is demanded in French law and the proportion of samples condemned varies from 20 to 25 per cent.

Laboratory methods of examination of milk samples are discussed, comprising :– physical (density and sediment), chemical (acidity and fat content), biological (reductase test), cytological, bacteriological (total count, selective culture for streptococci and coli-aerogenes group, microscopic examination of sediment for tuberculosis) and serological (brucella agglutination).

The authors studied milk at different stages from the udder to the consumer to determine the sources of contamination. The following comment relative to the illicit addition of water is illuminating. " When done at the farm, it is far more dangerous than that secret matutinal operation of which the public fountains themselves are sometimes the only witnesses. At any rate, the water from the public fountains is fairly pure. . . . "

As measures designed to improve the standard of the milk supply the authors advocate provision of good drinking water in rural districts, education of the country population in health matters and new legislation to enforce official supervision. They conclude that compulsory and supervised pasteurization is the only remedy available to produce the rapid results which their investigations have shown to be desirable.—H. T. Matthews.

## THERAPEUTICS.

Rothermundt, M. (1935). Die Bedeutung des Reticuloendothels für die Wirkung von Chemotherapeutika. **[The Role of the Reticulo-Endothelial System in Chemotherapeutic Action]**.—*Wiss. Woche Frankfurt, 1934.* **3.** 238-243.

Owing to the storage function of cells of the reticulo-endothelial system, those cells take up and store in an inactive state a large proportion of the dose of certain chemicals injected for therapeutic purposes. As much as half the amount inoculated may thus be inactivated, leaving an ineffective quantity for the destruction of parasites.—E. J. Pullinger.

—. (1935). **Report of the Committee on Proprietary Pharmaceuticals [Amer. Vet. Med. Ass.]**—*J. Amer. vet. med. Ass.* **87.** 425-428.

The work of the Committee on Proprietary Pharmaceuticals appears to embrace a much wider field than the title of the committee might suggest. The report reveals the very successful co-operation that is taking place between the Association and various responsible bodies in the United States of America. A special committee, charged with the duty of representing the requirements of veterinary therapeutics, has co-operated in the revision of the National Formulary. As a result of their representations, standards have been adopted for some drugs of peculiarly veterinary importance and preparations of others specially suitable for

veterinary use have been included. The committee has, in co-operation with the Food and Drug Administration of the United States Department of Agriculture, considered the position in regard to the advertising of livestock remedies of the "nostrum" class. As a result of their combined efforts, a considerable reduction in the sale of worthless remedies has taken place and one agricultural publication has discontinued the question and answer veterinary department and, in its place, publishes authoritative articles on the general aspects of disease control.—G. F. B.

SILBERSCHMIDT, W. (1935). Ueber Chemotherapie durch Inhalation. Versuche mit Trypanosomen. [**Chemotherapy through Inhalation. Research on Trypanosomes**].—*Schweiz. med. Wschr.* **65.** 551-553. 1 table. [5 refs.]

The author records experiments on the treatment of rats and mice infected with *Tryp. evansi* by inhalation of spray of 2 to 5 per cent. tartar emetic solution. Although the period of life was prolonged to three or four times that exhibited by controls, no actual sterilization of the blood could be produced.—U. F. RICHARDSON.

VAN ZWIETEN, M. (1935). Mededeelingen over resultaten van de behandeling met trypaflavine bij anaplasmose en mond- en klauwzeer. [**Treatment of Anaplasmosis and Foot and Mouth Disease with "Trypaflavine"**].—*Ned.-ind. Bl. Diergeneesk.* **47.** 263-269. [English and German summaries: abst. from orig.]

Treatment of anaplasmosis with "trypaflavine" (1 : 50) administered intravenously was successful in 20 water-buffaloes, 40 Ongole cows and 64 dairy cows. [See, however, PARKIN – this *Bull.* **6.** 167.—Ed.].

If given in the initial stage of foot and mouth disease in dairy cows, this treatment is said to be followed by successful results.

"Trypaflavine" stains the milk green for 24 hours.

—M. J. J. HOUTHUIS (ROTTERDAM).

VIDESOTT, R. (1935). L'eteroemoterapia in dieci casi di mioglobinemia paralitica. [**Heterohaemotherapy in Myoglobinuria Paralytica of Horses**].—*Nuovo Ercol.* **40.** 157-174. 1 fig. [12 refs.]

Following French reports [see this *Bull.* **5.** 659.] of the successful treatment of myoglobinuria paralytica by injections of large quantities of citrated blood, the author has tried this treatment alone in ten cases of the disease. The blood to be injected was obtained from the jugular veins of cows and received into sterile flasks containing 5 c.c. of 10 per cent. sodium citrate for every 500 c.c. of blood collected. A single dose of 500 c.c. of citrated blood was then injected subcutaneously at two or three points on the patient's neck. Of the ten horses so treated, seven recovered and three died; the latter, however, were *in extremis* when treatment was begun.

—J. A. NICHOLSON.

WALTHER, R. (1935). Versuche mit Valvanol in der Veterinärmedizin. [**The Use of "Valvanol" (Antiseptic) in Veterinary Medicine**].—*Berl. tierärztl. Wschr.* **51.** 661-662.

This article records experiments on the value of "valvanol" as a disinfectant for the skin for operations and for the hands. After shaving and washing the operation sites in dogs and horses, "valvanol" was applied for various periods in various concentrations.

In dogs, undiluted "valvanol" rendered the site germ-free in two minutes. In horses, in the open air, the operation site could be freed from bacteria by pure

" valvanol " in ten minutes, but in the operating room absolute freedom was not obtained. " Valvanol " used to disinfect the hands considerably reduced the number of bacteria, even when used at a concentration of as low as 10 per cent., but absolute sterility was not obtained.—U. F. RICHARDSON.

I. HALL, M. C. (1934). **Principles and Theories of Anthelmintic Medication.**—*Puerto Rico J. publ. Hlth.* **9.** 418-433. [9 refs.] [Spanish version pp. 434-446].

II. HALL, M. C. (1935). **Therapeutics of Worm Diseases.**—*12th Int. vet. Congr. 1934.* **3.** 1-19. [French, German and Spanish summaries].

III. SKRIABINE, K. J., & SCHULZ, R. S. (1935). Le problème de la déshelminthisation des animaux à l'U.R.S.S. [**The Problem of Parasitic Control in the Union of Socialist Soviet Republics**].—*Ibid.* 20-42. 1 table. [18 refs.] [English, German and Spanish summaries : abst. from orig. in French].

IV. —. (1935). **Discussion of Papers on Therapeutics of Worm Diseases.**—*Ibid.* 42-43.

I. Hall considers the essential fact in successful and safe anthelmintic medication to be the good judgement and experience of the clinician who, realizing the more or less poisonous nature of the necessary drugs, will administer them in the proper manner. In this paper, he gives an account of the most up-to-date information on what the clinician should know about animal parasites, anthelmintics, purgatives and prophylaxis.

II. The author first discusses the present status of parasite control, giving consideration to suggestions which have been made for taking international action ; he then discusses what conditions are unfavourable and what are favourable in considering a program for parasite control. He considers that " parasite control " should receive much more attention as a separate subject, and puts forward the suggestion that representatives of various countries should form a committee for its organization. In discussing therapeutic agents, he includes " adequate, well-balanced diets with the provision of necessary vitamins ", " certain minerals, such as those regarded as of value in combating anemia ", and " tonics ". Finally, the recent advances in anthelmintic medication are discussed.

III. The authors deal firstly with the anthelmintic treatments in general, prophylactic anthelmintic treatment, the necessity for exact diagnosis before proceeding with wholesale anthelmintic treatment and the estimation of the efficacy of the treatment after it has been carried out. Treatments for various parasites of all the ordinary farm and domestic animals and birds are then dealt with at length, under the headings of the various hosts. Finally, the authors state that greater attention should be given in veterinary colleges to this important subject, and emphasize the desirability of more uniformity in helminthological nomenclature. The suggestion which was made by Skriabine, at the preceding International Veterinary Congress, is repeated ; that an International Helminthological Congress should be convoked and an International Association formed.

IV. In the discussion, HALL referred to veterinary parasitology as a field of applied zoology of the greatest importance, comprising treatment and prophylaxis. He agreed with SKRIABINE that, where parasitic worms are concerned, treatment should be prophylactic.

With reference to HALL'S suggestion about the formation of an international committee on the control of parasites, DE BLIECK said that he was quite convinced of the desirability of setting up such a committee. On putting the matter to the vote, the proposal was carried unanimously.—E. L. TAYLOR.

Rietz, J. H. (1935). **Copper Sulphate as an Anthelmintic for Gastro-Intestinal Parasites of Sheep.**—*Bull. W. Va agric. Exp. Sta.* No. 264. pp. 20. 18 tables. [1 ref.]

Rietz reports a series of observations on the effect of repeated treatments with 3 to 4½ oz. doses of 1 per cent. and 1·5 per cent. solutions of copper sulphate on the numbers of the eggs of strongyloid worms in the faeces of sheep. The experimental sheep were chosen from among two flocks and are stated to have shown symptoms of advanced parasitism [the egg counts and worm counts appear to indicate, however, that they were carrying a comparatively light infestation]. Marked reductions in the egg output of treated sheep were shown to take place as a result of treatment; these varied from 50·8 per cent. in sheep receiving 14 treatments of 4½ oz. of a 1 per cent. solution to 94·9 per cent. in sheep receiving seven treatments of 3 oz. of a 1·5 per cent. solution. It was concluded that withholding food for 24 hours prior to dosing encourages the passage of the drug directly to the abomasum, that a 1·5 per cent. solution is better than a 1 per cent. solution, that the 1·5 per cent. solution is quite safe and, if used at regular intervals of three weeks, has a marked effect in reducing the nematode infestation of sheep.
—E. L. Taylor.

Moe, L. H., Craft, W. A., & Thomson, C. P. (1935). **Supplementing Soil with Iron and Copper for the Prevention of Anemia in Young Pigs.**—*J. Amer. vet. med. Ass.* **87.** 302-311. 2 figs., 2 tables. [6 refs.]

It has been shown that the haemoglobin values in pigs kept indoors show a marked decline during the first 14 days of life. Controlled experiments indicate that when litters have access to soil, especially if this contain in addition quantities of iron and copper, the decline in haemoglobin between birth and one week of age is much less marked. The addition of 9 g. ferrous sulphate and 1·5 g. copper sulphate to each 50 lb. of moist soil appears to represent an adequate supplement, in that it prevents anaemia and effects a significant increase in weight.—J. R. G.

Steyn, D. G. (1935). **A Further Experiment to Determine the Safe Dose of Sulphur for Sheep.**—*J. S. Afr. vet. med. Ass.* **6.** 183-187. 1 fig., 2 tables. [3 refs.]

This experiment was carried out to determine the effect of feeding sulphur to immature sheep for a period of 16 months. The sheep, which were two-teeth merino wethers, were fed 5 g. of sulphur daily in addition to a diet of crushed maize, teff hay (*Poa abyssinica*) and green food *ad lib.* The sulphur used was free from arsenic. Two sheep in the experiment developed gastro-intestinal irritation but, as one of the controls did also, sulphur may be excluded as the cause. From the data gathered during the experiment it may be judged that the feeding of sulphur had no detrimental effect on the body weight or wool yield of the animals. None of the animals developed urinary calculi.—E. M. Robinson.

Engelkes, H. (1935). **Treatment of Haemorrhagic Disorders with Vitamin C.** *Lancet.* **229.** 1285-1287. 1 table. [4 refs.]

This article records the use of intravenous injections of ascorbic acid in three cases of haemorrhagic disorder in human beings. The diagnoses in these three cases were :– (1) essential thrombopaenia with haematuria; (2) purpura infectiosa, and (3) essential haematuria. The only remedy given was ascorbic acid, except in the third case where the patient had salicylates after the haemorrhage had disappeared. In all three cases the administration of ascorbic acid was followed

by rapid improvement, with disappearance of haemorrhagic manifestations. No unpleasant symptoms were produced.

Two other cases showing capillary haemorrhage, in which the same treatment proved successful, are mentioned.—A. Robertson.

Koch, W. (1935). Ueber Geschlechtshormone und den derzeitigen Stand ihrer Anwendung in der Veterinärmedizin. [**The Use of Sex Hormones in Veterinary Medicine**].—*Münch. tierärztl. Wschr.* **86.** 409-414. 2 figs., 2 tables.

The therapeutic use of sex hormones has considerably increased during the last few years, but the results so far obtained have led to conflicting opinions as to the value of this line of treatment. This is chiefly because the scientific foundations of endocrinology have recently undergone important changes, which naturally alter the principles underlying hormone therapy, and an attempt is now made to give a concise account of the present position.

In the first place, it is certain that the nervous system exercises a direct control over hormone production [see this *Bull.* **6.** 177.] but apart from this, the pituitary gland is responsible for regulating the hormonal stimulus of the sexual cycle. This it does by means of the gonadotropic hormone, prolan, which is secreted by the anterior portion of the gland. Prolan is also produced by the placenta during pregnancy, but this substance is not identical with that of the anterior pituitary, nor is prolan of mares identical with prolan of women. In both sexes, this hormone stimulates the germinal epithelium ; in the female, this results in the development of the ovarian follicles and ripening of the ovum. At a later stage of oestrus, it causes the expulsion of the ovum and the formation of a corpus luteum ; in the male, it stimulates spermogenesis and the formation of testicular hormone.

Oestrin is produced by the Graafian follicles during maturation. This hormone is responsible for the development of the secondary female sex characters and for inducing the onset of the external signs of oestrus. It causes enlargement of the uterus, development of the uterine glands and mucous membrane and, in some animals, the extravasation of blood. In addition, oestrin causes a thickening of the vaginal mucous membrane with cornification of the superficial cells. It may also exert a direct action on the sex centre in the medulla.

The corpus luteum produces progesterone, which possesses three distinct actions. It causes the so-called pregravid phase in the development of the uterine mucous membrane which makes possible the attachment of the ovum ; it prevents further follicles from ripening and, finally, it guarantees the continuance of pregnancy.

The hormone obtained from the posterior pituitary gland acts on the intestine and vascular system as well as on the uterus. Preparations of this hormone may be divided into those which possess all these actions, *e.g.* hypophysin, pituitrin, etc., and those which act only on the uterus, *e.g.* orastin. The posterior pituitary hormone is responsible for inducing uterine contractions at the time of parturition ; it cannot, however, bring about parturition unaided.

The male sex hormone, androsterone, is elaborated by the testes and causes the development of the secondary male sex characters ; it also acts on the sex centre in the medulla.

Experience has shown that, for the treatment of oestral disorders in cattle and horses, prolan gives better results than oestrin, whereas the reverse is the case in bitches. Prolan has also been of value in the treatment of bulls which exhibited no desire for copulation, although they showed no clinical signs of disease of the reproductive organs. In cattle and horses, 125 rat units of prolan

appears to be a suitable dose ; its administration to females should not be repeated until the lapse of a complete sexual cycle. Over-doses lead to a persistent corpus luteum and nymphomania.

Hormone therapy is only indicated in cases where metabolic disturbances are present, arising for example from an excess of fat, avitaminosis or unsuitable environmental conditions. If failure to breed is due to a faulty diet, hormone therapy should only be employed in those cases in which the diet has remained deficient, otherwise there is a risk of an over-supply of hormones. In conclusion, hormone therapy is at present only in the experimental stage, but it possesses great possibilities.

In the appended table of synonyms, the first name is the one usually adopted.

| Anterior Pituitary. | Posterior Pituitary. | Testis. |
|---|---|---|
| Prolan. | Pituitrin. | Androsterone. |
| Gonadotropic hormone. | Oxytocin. | Androtin. |
| Pregnant mare hormone. | Hypophysin (proprietary). | Testicular hormone. |
| Prolan A. | Orastin ,, | |
| Prolan B. | Pitressin ,, | |
| Hebin. | Tethelin. | |
| Pregnyl (proprietary). | | |

| Ovary. | | Corpus luteum. |
|---|---|---|
| Oestrone. | Theelin. | Progesterone. |
| Oestrin. | Thelestrin (proprietary). | Progestin. |
| Follicular hormone. | Emmenin. | Luteosterone. |
| Folliculin. | Menformon (proprietary). | |
| Progynon. | Menoformone. | |
| Theelol. | | |

—J. A. Nicholson.

## POISONS AND POISONING.

Raucourt. (1935). Observations sur la toxicité des insecticides arsenicaux. [**The Toxicity of Arsenical Insecticides**].—*Rev. vét., Toulouse.* **87.** 591-597. 1 table. [1 ref.]

The author discusses the possibility of poisoning in animals and man from the application of arsenical insecticides to fruit trees. He concludes that if care is exercised in their application these insecticides can be used without fear of the occurrence of serious poisoning.—G. D. Shearer.

Phillips, P. H., Hart, E. B., & Bohstedt, G. (1934). **Chronic Toxicosis in Dairy Cows Due to the Ingestion of Fluorine.**—*Res. Bull. Wis. agric. Exp. Sta.* No. 123. pp. 30. 4 figs., 14 tables, 2 charts. [10 refs.]

The authors studied the effect of the addition of rock phosphate, containing fluorine, to the diet of dairy cows over three lactation periods. It was found tha t

a daily fluorine intake of 1 to 2 mg. per kg. body weight does not materially retard growth, but that, if the daily intake exceeds 3 mg. per kg. body weight throughout the growth period, growth is retarded and, during lactation, there is loss of weight and reduced milk production. The authors suggest, therefore, that the limit of fluorine tolerance per day in dairy cows is from 2 to 3 mg. per kg. body weight ; if this limit is exceeded, there is reduction in food consumption and inanition, resulting in marked cachexia.

The addition of rock phosphate, containing fluorine, to the extent of 1·25 and 2·5 per cent. of the basal ration causes a reduction in the milk yield of 20 to 25 per cent. and 40 to 50 per cent. respectively. There is a delay in oestrum following parturition and the birth weight of new-born calves is lowered, probably due to the poor condition of the cows caused by faulty nutrition.

The pathology of the disease is characterized by disturbance of the bone-forming mechanism, resulting in thickening and exostosis of the long bones and mandibles. There is also hypoplasia of the enamel of the teeth and excessive abrasion of the second and third molars and premolars. From other experiments carried out but not recorded in detail in the present paper, the authors are of the opinion that chronic fluorine poisoning causes changes in cellular respiration and attacks the enzymatic systems of the body.

Fluorine is principally stored in the skeleton and teeth, the other organs being particularly free from this element.—G. D. Shearer.

von Hazslinszky, B. (1935). Ueber Vergiftung bei Pferden durch Glechoma. [**Poisoning of Horses by Glechoma (Ground Ivy)**].—*Dtsch. tierärztl. Wschr.* **43.** 708-709. [5 refs.]

Seven out of 12 horses became ill after being at grass for six days and feeding on freshly cut lucerne hay. Ground ivy growing in the field was thought to be the cause. Symptoms and *post-mortem* lesions are described.

Experiments were conducted which showed that ground ivy is poisonous for the horse in the fresh or newly cured state but is harmless if it has been cured for more than a month.—G. D. Shearer.

Pichon, & Baissas. (1935). Le fagopyrisme chez les bovidés. [**Buckwheat Poisoning in Cattle**].—*Rév. gén. Méd. vét.* **44.** 524-529.

This is an account of the symptoms of fagopyrism seen by the authors in cattle in France.—G. D. Shearer.

Rimington, C., & Steyn, D. G. (1935). **Note upon the Isolation of the Toxic Principle from a Species of** *Dimorphotheca*, **probably** *Dimorphotheca fruticosa*. —*Onderstepoort J. vet. Sci.* **5.** 79-80. 1 table. [3 refs.]

The isolation of the toxic principle, a cyanogenetic glucoside, from a *Dimorphotheca* species (probably *fruticosa*) is described and the author gives the technique employed in the isolation. The leaves of the plant were found to contain the equivalent of 1·5 g. of HCN per 100 g.—E. M. Robinson.

Wagner, H. (1935). Tödliche Vergiftung von Schafen infolge übermässigen Genusses grüner Eicheln. [**Fatal Poisoning of Sheep by Green Acorns**].—*Berl. tierärztl. Wschr.* **51.** 452-453.

The author describes the results of allowing a flock of 200 sheep to eat large quantities of acorns blown on to a pasture. Eight died in a few hours and others were sick. The symptoms and lesions, which were those typical of acorn poisoning, are described.—G. D. Shearer.

## PHYSIOLOGY.

AMBERSON, W. R., FLEXNER, J., STEGGERDA, F. R., MULDER, A. G., TENDLER, M. J., PANKRATZ, D. S., & LAUG, E. P. (1934). **On the Use of Ringer-Locke Solutions containing Hemoglobin as a Substitute for Normal Blood in Mammals.**—*J. cell. comp. Physiol.* **5.** 359. 6 figs., 1 table. [Numerous refs.] [Copied *verbatim* from *Physiol. Abstr.* **20.** 192-193. Signed V. J. WOOLLEY].

Cats can be kept alive for 36 hours if all their blood is replaced by a 12-14 p.c. solution of haemoglobin in Ringer, and their behaviour is normal for many hours. Death occurs when the haemoglobin has fallen to about 3 p.c.

PROTASJENJA, T. P (1935). Ueber die Rolle der Aussenatemprozesse bei den Pferden und Hunden. [**The Mechanism of Respiratory Expiration in Horses and Dogs**].—*Arch. wiss. prakt. Tierheilk.* **69.** 287-289.

The author states that, according to the ideas of several physiologists, removal of the negative pressure in one or both pleural cavities in the horse is followed by atelectasis and death from asphyxia. This, he states, is not in accordance with his clinical experience and he gives his observations on 21 cases in the horse of unilateral pneumothorax which did not end fatally. He gives details of operations carried out on the horse and dog in which the negative pressure in the pleural sac on one side was removed and the animals made uninterrupted recoveries.

—G. DODS MUNRO.

PLANTEFOL, A., & SCHARNKE, H. (1934). Contribution à l'étude du rôle des sacs aériens dans la respiration des oiseaux. [**Functions of the Air Sacs in Birds**].—*Ann. Physiol. Physiochim. biol.* **10.** 83-133. 3 figs., 24 tables, 2 charts. [7 refs.]

The study of the physiology of respiration in birds is complicated by the presence of air sacs throughout the body, the respiratory functions of which have remained obscure, although it is admitted that they participate in respiration and that there are physiological differences between them. In this work, a study of the concentrations of carbon dioxide and oxygen in certain of these air sacs has been made. For this purpose pigeons were used and it was found possible to obtain air samples from any desired sac by means of a syringe and needle. A 5 c.c. syringe was used but only 2 c.c. samples were taken, the unoccupied space in the syringe being filled with mercury or vaseline which also ensured that the instrument remained airtight. The air thus obtained was passed directly into a glass ampoule, by means of a three-way tap, and analysed by the micro-method of Plantefol.

It was found that the average carbon dioxide concentration varied between 1·26 and 3·89 per cent. and the oxygen concentration between 5·15 and 6·4 per cent. in the abdominal, clavicular and prethoracic air sacs. The concentration of the gases in these air sacs varied considerably among individual birds, but repeated analyses of air from the same sac and bird showed that the figures remained very constant. The lowest concentration of carbon dioxide was always found in the abdominal air sac. It was also found that carbon dioxide injected into an abdominal air sac passes directly into the clavicular sac and remains in both these sacs until forced expiration is induced, *e.g.* by coughing. Carbon dioxide injected into the prethoracic sac is dispelled immediately. When carbon dioxide is injected into the abdominal cavity, its concentration in the abdominal air sac is at once raised, showing that diffusion through the walls of the sacs is possible.

The author concludes that the abdominal and clavicular air sacs, which are

the fundamental part of the extra-pulmonary respiratory system, do not participate to any great extent in the regular ventilation of the body ; the prethoracic sac does so, however. The two former air sacs work together and are only called into play by forced respiratory movements. The abdominal sac is not ventilated through the lungs but directly through the large bronchi.—J. A. Nicholson.

Edland, H. (1935). Untersuchungen über die Struktur des elastischen Gewebes in den Arterien mit besonderer Rücksicht auf das Vorkommen der sogenannten " Homogenen, Elastischen Membranen ". [**The Structure of the Elastic Tissue in Arteries**].—*K. VetHogsk. Aarsskr. Copenhagen, 1935.* pp. 58-89. 10 text figs., 5 figs. on 2 plates. [64 refs.] [In German].

An examination, extending over a period of years, was carried out on the arteries of horses, cattle, pigs and dogs. Only those tissues which were stained specifically by orcein and resorcin-fuchsin were considered as elastic tissue, and longitudinal, transverse and horizontal sections were examined.

The tunica media of the aorta of horses consists of a network of elastic fibres which branch and anastomose, the spaces between the large fibres being filled in with smaller fibres. In cattle, the elastic fibres of the aorta are thicker, broader and flatter than those of the horse, and they form a very close network with occasional round or oval spaces between them filled with small fibres. The same structure is seen in calves and pigs, but in dogs the main fibres are smaller and more nearly resemble those seen in the horse. The fibres seldom take a circular course, but are usually spiral or oblique. The elastic fibres of the tunica intima are mainly longitudinal, and in the tunica adventitia their arrangement is similar to that seen in the media. In the spermatic artery of dogs, the elastic tissue is localized in the tunica intima and tunica adventitia.

The elastic fibres are embedded in a ground substance of connective tissue, but no evidence of a homogeneous elastic membrane was ever obtained.—J. A. N.

## TECHNIQUE.

Elford, W. J., Grabar, P., & Ferry, J. D. (1935). **Graded Collodion Membranes for Bacteriological Studies. Practical Aspects of the Mechanism Determining the Character of the Membrane, and the Roles of Particular Solvent Constituents.**—*Brit. J. exp. Path.* **16.** 583-587. 1 chart. [4 refs.]

The underlying principle in preparing " gradocol " membranes is the controlled variation of the aggregation of the nitrocellulose, in an appropriate mixture of purified and dried solvents, relative to the incidence of spontaneous gelation. If aggregation is relatively advanced by the addition of a non-solvent, a more porous film is obtained, and *vice versa*. To correct sediment formation, promote gelling and retard aggregation, 0·1 to 0·2 per cent. of ethylene glycol monoethyl ether may advantageously replace the acetic acid originally advocated. The amyl alcohol used should be " pyridine and nitrogen free ". The intimate physical structure of the membranes is briefly discussed.—E. Weston Hurst.

Morris, M. L., Dinkel, J. H., & Green, D. F. (1935). **A Comparative Study of the Drop Method and Concentration Method for the Diagnosis of Dirofilaria immitis, Canine Heart-worm.**—*N. Amer. Vet.* **16.** No. 11. 39-40. 1 table. [2 refs.]

One hundred dogs of ages ranging between six months and 14 years and of

various breeds were examined by two methods for infestation with *D. immitis* :– (a) by direct search in a drop of fresh blood between slide and cover-slip, and (b) by microscopic examination of 1 c.c. of blood by the method used in examining human blood for microfilariae after concentrating the microfilariae [the blood for this purpose is added to 5 c.c. of a 2 per cent. acetic acid solution and centrifugalized for three to five minutes, at the end of which time all the microfilariae are concentrated in one drop of sediment]. The comparison showed that the direct method may fail to reveal the presence of microfilariae in 50 per cent. of infected dogs. Contrary to the observations of WRIGHT, short-haired dogs were not found to be more frequently parasitized than long-haired dogs. The incidence of infestation was noticed to increase with the age of the dogs.—E. L. TAYLOR.

LAUBENHEIMER, K. (1935). Neuzeitliche mikrophotographische Universalapparate. [**Modern Photomicrographic Apparatus**].—*Z. InfektKr. Haustiere.* **47.** 110-119. 6 figs. [3 refs.]

The development of photomicrographic apparatus is briefly reviewed and the new universal " Panphot " instrument, which can be used for photographing solid or transparent objects by reflected or incident light, is described. Its field of use is very wide.—E. J. PULLINGER.

CASERIO, E. (1935). Richerche sulla conservazione dei sieri con formalina. [**On the Preservation of Sera by Means of Formalin**].—*G. Batt. Immun.* **14.** 1361-1368. 4 tables. [English, French and German summaries]. [Copied *verbatim* from *Bull. Hyg., Lond.* **10.** 737-738. Signed H. H. S.]

The objects of the author's studies were in the main three : (1) To determine whether addition of formalin to 0·5 per cent. would sterilize serum as regards the presence of spores (*B. subtilis* was used) ; (2) To determine the presence of formalin after varying intervals ; (3) To determine the possibility of neutralizing the formalin without effect on the serum.

His procedure was to distribute 100 cc. of horse serum in 50 receptacles ; some were kept as controls, to others was added 0·1, 0·3 and 0·5 per cent. formalin (40 per cent. formaldehyde). To the latter were added sporing cultures of *B. subtilis*, and the tubes were kept at 6°, 15° and 35°C. and examined after 45, 100 and 200 days.

The hydrogen ion concentration was determined by Hellige's method, the presence of the organism by cultural attempts in broth and on agar and the estimation of residual formalin by Rimini's method.

Protocols of the different experiments are given and the final conclusions were that in a strength of 1 in 1,000 formalin will sterilize at a temperature above 15°C. while greater concentrations coagulate the serum, more and more rapidly according to the degree of concentration and the rise in temperature. Traces of formalin after being added in this low concentration of 0·1 per cent. could be found 200 days later ; the amount was small and was inversely to the temperature and the duration of time. The formalin could be neutralized without damage to the therapeutic value of the serum, but the globulin content increased with length of contact, with amount of formalin and rise of temperature, whereas the serum-albumen (serine) diminished *pari passu.*

The author concludes : " This antiseptic cannot be used for sterilization, for at 15° and at 35°C. (59° and 95°F.) it causes deep alterations in the serum, while at 6°C. (45·8°F.) the serum is not altered, but its sterilization is not thorough enough. "

## MISCELLANEOUS.

GILRUTH, J. A. (1934). **Agricultural and Veterinary Reorganization in Tasmania.** —*Aust. vet. J.* **10.** 222-229.

The organization of the agricultural and veterinary services in Tasmania is described and there are a number of anomalies which do not make for efficiency. This report recommends that the present Department of Agriculture should be divided into two departments – one of Agriculture and one of Animal Health, that the heads of each be directly responsible to the same Minister and that a properly constituted Council of Primary Production be established.—W. I. B. BEVERIDGE.

I. NACHTSHEIM, H. (1933). Tierzüchterische Ergebnisse des VI. Internationalen Kongresses für Vererbungswissenschaft, Ithaca 1932. [**Review of the 6th International Congress on Genetics, Ithaca, 1932**].—*Züchtungskunde.* **8.** 193-213.

II. OSSENT, H. P. (1933). Die Züchtung widerstandsfähiger Schweinerassen. [**The Breeding of Pigs Resistant to Disease**].—*Ibid.* 399-402.

III. NACHTSHEIM, H. (1933). Zur Frage der Züchtung seuche-immuner Hausschweine. [**On Breeding Disease-Immune Pigs**].—*Ibid.* 450-452.

IV. OSSENT, H. P. (1934). Schweinepest oder Schweineseuche. [**Swine Fever or Swine Plague**].—*Ibid.* **9.** 106-107.

I. In a report of the proceedings of the congress, Nachtsheim criticizes OSSENT'S claim to have bred disease-immune swine [this *Bull.* **4.** 208.], stating that there is no evidence given that any resistance to disease shown by the experimental swine was a hereditable characteristic.

II. Ossent again reviews his breeding results, stating that, of hundreds of pigs bred from crossing a Russian wild boar with German domestic sows, those inheriting the colour of the wild boar proved to be very resistant to " chronische Schweineseuche ", whilst their litter mates of white (domestic breed) colour were very susceptible. He suggests that NACHTSHEIM thought that his claim of resistance to disease meant " Schweinepest " [swine fever]. Ossent disclaims having bred pigs resistant to " Schweinepest " and refers to the negative results in this connexion of UHLENHUTH, MIESSNER and GEIGER [this *Bull.* **3.** 427]. [The true identity of " chronische Schweineseuche ", as used by this author, is still not yet clear, as Ossent here refers to it as being caused by a virus distinct from that of " Schweinepest "].

Ossent refers further to breeding experiments with two-toed but single-hoofed swine from South America. He intends to find out whether one-hoofed crosses possess an increased resistance to " Klauenseuche " [foot and mouth disease no doubt meant].

III. Nachtsheim denies having confused " Schweineseuche " and " Schweinepest " and elaborates his technical criticism of OSSENT'S original claim.

IV. Ossent concludes the argument by asserting that the results of his ten years' work have clearly shown that, while 80 to 100 per cent. of his domestic breed died when exposed to " chronische Schweineseuche " [this term, however, here being used for a disease other than *Pasteurella suiseptica* infection], 95 per cent. of his " wild-coloured " pigs resisted it and could be reared successfully. —J. E.

VOGT, V. (1935). Zur Frage der Resistenz des wildfarbigen Müncheberger Hausschweines gegen die Ferkelgrippe. [**Resistance of " Wild-Coloured "**

**Muncheberger Pigs to Swine Influenza**].—*Berl. tierärztl. Wschr.* **51.** 765-768. 1 fig. [14 refs.]

The author describes his investigations into a disease of piglets bred from a boar and sows of the wild Müncheberger breed. Laboratory examination showed the disease to be piglet influenza. This is offered as evidence that wild pigs are as susceptible to piglet influenza as the domestic breed.

Vogt criticizes at length OSSENT's claim to have produced a cross-breed between wild and domestic swine resistant to " Schweineseuche " [see previous abstract] and states that, in the experience of research workers at the Isle of Riems [the German research station for foot and mouth disease and other virus diseases] there is no such disease as swine plague (pasteurella infection) either in the acute or chronic form, but that the disease hitherto so-named is really swine influenza, complicated by pasteurella infection, which is a universal saprophyte in pigs.
—J. E.

DALE, H. (1935). **Some Epochs in Medical Research.**—*Lancet.* **229.** 927-933.

The Harveian Oration delivered before the Royal College of Physicians, London, on October 18th, 1935.

The increasing dominance of chemical ideas in medical and biological research is recognized as a prevailing tendency. Research on hormones is a sphere in which chemical investigation has proved most successful. The synthesis of vitamins and their chemical isolation have enabled research workers to determine exactly the nature of what were recently regarded as intangible traces of unstable substances.

In this field lie the recent discoveries of choline and betaine. In conclusion, reference is made to the part played by structural chemistry in the investigation of antigenic specificity.—G. F. BODDIE.

—. (1934). **The 27th Annual General Meeting of the S.A.V.M.A.**—*J. S. Afr. vet. med. Ass.* **5.** 221-226.

In the discussions which took place at this meeting, a number of interesting points were brought up. The extension of foot and mouth disease from Southern Rhodesia to the Bechuanaland Protectorate and Northern Rhodesia and its recurrence in the first-named country formed the subject of a considerable debate. The decrease in the number of cases of rabies diagnosed in wild carnivora during the year was rather remarkable, and was attributed to the heavy mortality amongst the meerkats as a result of the excessive rains. Other matters dealt with were the enormous increase of worm infestations in sheep due to the abnormal rainy season, and the success of the Harris trap as a method of reducing the number of tsetse flies in nagana areas. Several papers were read at the meeting, including one on swine fever which had recently broken out on a large scale in the Western Province.
—E. M. ROBINSON.

—. (1935). **Report of the Committee on Veterinary Biological Products [Amer. Vet. Med. Ass.]**—*J. Amer. vet. med. Ass.* **87.** 424.

The Committee on Veterinary Biological Products, appointed by the American Veterinary Medical Association, point out that the Association has neither means nor facilities to investigate the efficacy of veterinary biological products ; they therefore decided to assess the value of these products from the data published in the literature. On this basis, they examined the position in regard to rabies vaccine and concluded that either phenol-killed or chloroform-killed vaccine containing 20 per cent. brain and cord tissue can be recommended as an immunizing agent.
—G. F. BODDIE.

—. (1935). **Report of the Committee on Education [Amer. Vet. Med. Ass.]**—*J. Amer. vet. med. Ass.* **87.** 411-424.

A review of the developments in instructional facilities, etc., of the ten American and two Canadian veterinary colleges. The former now require that veterinary students should complete one year's " college work " before enrolment. The standard of general education demanded has thus been raised. Some colleges, notably Cornell, are only able to accept a proportion of the applicants. 1,866 students were enrolled in the 12 colleges in 1935.—J. E.

—. (1935). Convention internationale pour la lutte contre les maladies contagieuses des animaux. **[International Convention for the Control of Contagious Diseases of Animals]**.—*Bull. Off. internat. Epiz.* **11.** 98-105.

—. (1935). Convention internationale concernant le transit des animaux, des viandes et des autres produits d'origine animale. **[International Convention Concerning the Transport of Animals and Animal Products]**.—*Ibid.* 105-113.

—. (1935). Convention internationale concernant l'exportation et l'importation de produits d'origine animale (autres que les viandes, les préparations de viande, les produits animaux frais, le lait et les dérivés du lait). **[International Convention Concerning the Export and Import of Animal Products (Other than Meat or Milk)]**.—*Ibid.* 114-120.

At a meeting held on February 20th, 1935, at Geneva, representatives of Bulgaria, France, Italy, Lithuania, Poland, Rumania, Switzerland and Czechoslovakia signed conventions as follows :–

(1) Contagious Diseases.—Each high contracting party undertakes to take legislative and administrative measures to assure an effective control of contagious diseases by the following methods :– routine inspection of herds, abattoirs, markets, creameries, stables, etc. ; the control of the manufacture and sale of biological products ; inspection of the means of transport, ports and quarantine stations ; the notification of outbreaks ; the regulation of transport, and the disinfection of vehicles.

Each country is to create and maintain a state veterinary service for the application of agreed measures, and also to establish schools, research institutes and scientific laboratories. The veterinary services are to be under a chief veterinary surgeon responsible direct to the Minister, the personnel to be sufficient for the work required.

Each country is to issue fortnightly veterinary bulletins, giving full information as to rinderpest, foot and mouth disease, contagious bovine pleuro-pneumonia, anthrax, sheep pox, rabies, glanders, dourine, swine fever, etc. On the outbreak of any disease the fact is to be telegraphed to all neighbouring states.

(2) Transport.—Each country agrees to permit the transport of animals and animal products coming from countries where the first convention is in force, subject to notification to the veterinary service of all consignments except animal products. If rinderpest exists in the country of origin no transport is allowed, and if swine fever, foot and mouth disease, sheep pox or contagious bovine pleuro-pneumonia exists, the receiving country may refuse transport. All consignments must be accompanied by a veterinary certificate and must be carried in special wagons. Veterinary inspection at the frontiers provides for turning back all suspected animals or carcasses, or for the slaughter of animals.

(3) Exportation and Importation.—Each country agrees to admit free traffic in animal products other than meat, meat preparations, milk and milk derivatives, from countries where the first convention is in force. The existence of rinderpest in an exporting country will authorize other countries to refuse

admission of such articles. If outbreaks of anthrax, swine fever, foot and mouth disease, or sheep pox become serious in any country, the others may demand a veterinary certificate as to freedom from infection of the products imported, and in other cases may refuse admission to such products.—F. Bullock.

Charnot, & Faure. (1935). Les scorpions du Maroc. **[The Scorpions of Morocco].**—*Bull. Acad. vét. Fr.* **8.** 273-274.

This note gives a summary of an article of six chapters written by the authors after a study of the scorpions of Morocco. The article deals with the varieties of scorpions, the toxicity of their stings and the clinical effects on various species of animals. A detailed study is included of the venom of the various species, and general directions for the treatment of stings and advice on the control of these pests is given.—U. F. Richardson.

## OFFICIAL AND OTHER REPORTS.

—. (1935). **Twelfth International Veterinary Congress, New York, U.S.A., 1934.** Vol. 1. pp. 354. Vol. 2. pp. 632. Vol. 3. pp. 548. Numerous figs., tables and charts. [Numerous refs.] [English, French, German and Spanish summaries]. Washington, D.C. : Govt. Printing Off. [8vo].

The three volumes of reports of the Congress appeared between August and November, 1935, and comprise a valuable précis of modern knowledge on the numerous important diseases and veterinary work discussed. The individual papers are being abstracted separately in this *Bulletin*.

At the closing meeting various resolutions were passed ; they were, briefly, as follows :- (1) provisions for additional official languages for use at future congresses ; (2) sundry detailed alterations to the resolutions on tuberculosis, passed at the 9th Congress at the Hague in 1909 ; (3) the creation of an international commission to discuss caseous lymphadenitis in sheep, from the point of view of meat inspection ; (4) the creation in each country of a central organization for the control of diseases of young animals ; (5) the creation of a permanent international committee for the control of parasitic diseases ; (6) sessions on poultry diseases to be combined at future congresses ; (7) the urgency of increased attention to genetics by veterinarians ; (8) the urgency of the need for disseminating more rapidly results of research, and recommendations to this end ; (9) the urgency of milk control by veterinarians, and (10) an appreciation of the United States Bureau of Animal Industry.—J. E.

Great Britain. (1935). **Ministry of Agriculture and Fisheries. Report of Proceedings under the Diseases of Animals Acts for the Year 1934.** [Kelland, P. J. L.] pp. 90. 26 tables, 4 appendixes. London : H. M. Stat. Off. [8vo] [1s. 6d.]

Part I of the report deals with the position in Great Britain with regard to contagious diseases of animals ; the list of notifiable diseases remains unchanged. Statistical tables are included in Appendix I showing the distribution of diseases in each county of Great Britain.

During the year there were 79 outbreaks (73 in England and 6 in Wales) of foot and mouth disease, of which 77 occurred in the last five months of the year, 68 being confirmed subsequently to the 19th October. No outbreaks occurred in Scotland. There were 20 new centres of infection in 1934 and full particulars of

these are given. Nineteen initial or " parent " outbreaks occurred in regard to which no connexion with any other centre of disease could be traced ; despite the usual exhaustive enquiries, in none of these was the original source of infection definitely identified.

According to the returns furnished by the local authorities, tuberculosis in one or other of the forms referred to in the Tuberculosis Order of 1925 was reported to exist on 24,512 premises during 1934 as compared with 23,608 premises in 1933. The number of animals examined by veterinary inspectors rose from 350,550 to 393,343. The examination of these animals resulted in 22,180 cattle being declared to come within the scope of the Order. Of these, 22,009 were slaughtered by local authorities, and the total sum paid as compensation was £78,077, an average of £3 10s. 11d. per head. The numbers of affected animals in the four categories were :– (a) cows giving tuberculous milk, 741 ; (b) cows with tuberculosis of the udder, 3,443 ; (c) bovine animals with tuberculous emaciation, 7,366, and (d) bovine animals with a chronic cough and clinical signs of tuberculosis, 10,630.

There were 684 outbreaks of sheep scab during the year ; the distribution of the disease and the measures adopted to deal with it are described in the report. Outbreaks in the counties bordering the Pennine Range accounted for 401 outbreaks, or 82 per cent. of the total in England. In Scotland, 52 outbreaks occurred in the Outer Hebrides and ten on the mainland. During the year, 28 sheep dips were approved for use under the Orders of the Minister relating to sheep scab and sheep dipping. Areas to which Parts II and III of the Sheep Scab Order of 1928 were applied are described.

The number of suspected outbreaks of swine fever reported was 14,192 ; of these, 1,833 were confirmed as against 1,414 in 1933. Enquiries showed that 370 outbreaks were due to market infection or to infection during conveyance to or from markets ; in 618 other outbreaks the affected swine had recently passed through a market and may thus have become affected.

During 1934, 395 cases of anthrax were confirmed as compared with 297 in 1933. A table of probable origins is given.

There were 115 outbreaks of parasitic mange of equines, involving 31 counties, as compared with 132 outbreaks in 38 counties in 1933.

Part II deals with the subject of importation with regard to preventing the introduction of contagious diseases of animals into Great Britain. The cases of scheduled diseases found in imported animals in the landing places were limited to four cases of tuberculosis, as defined in the Tuberculosis Order of 1925, and 61 cases of sheep scab. No cases of rabies occurred among imported dogs or cats in quarantine.

Part III deals with the protection of animals during transit and with exportation of horses, and Part IV with the export of pedigree and other livestock and of raw animal products under the regulations of the importing countries. New Zealand still maintained the complete embargo on direct shipment of ruminants and swine from the United Kingdom, which has now been operative for over ten years.

Part V deals with the work at the Veterinary Laboratory. The following specimens were received for purposes of diagnosis in suspected cases of diseases dealt with under the Diseases of Animals Acts in which diagnosis rested with the Ministry :– swine fever 4,929, anthrax 617, sheep scab 196 and rabies 9. 21,204 doses of vaccine were supplied to veterinary surgeons for the inoculation of animals in herds affected with epizootic abortion ; 1,243 agglutination tests were carried out. The preparation of BCG vaccine was continued and 947 doses were issued. In the case of poultry, 188,128 agglutination tests were conducted. The number

of doses of vaccine issued for fowl pox and avian typhoid was 440,036 and 13,049 respectively. A résumé of research work is given ; the subjects included :– *Babesia bigemina* infection in cattle, *Brucella abortus* infection of cattle, tuberculosis, parasitic gastritis of sheep, syngamiasis in poultry, salmonella infection in birds, Newcastle disease in fowls, fowl cholera and metabolic disorders of farm animals.
—J. C. Wallace.

Great Britain. (1935). **Report on the Work of the Education and Research Division of the Ministry [of Agriculture & Fisheries], 1933-4. I. Agricultural Research (including Local Investigation and Advisory Work).**—*J. Minist. Agric.* **42.** 676-690. 9 tables. [3 refs.]

The Ministry is mainly concerned with the administration of various grants to Agricultural Research Institutes, for advisory services and for special schemes of research and investigation.

The expenditure on agricultural research and advisory work in England and Wales during the financial year 1934 amounted to approximately £282,300 as against £287,400 in 1933. The latter sum, however, included government contributions to the Imperial Agricultural Bureaux, the Imperial Institute of Entomology, and the Imperial Mycological Institute, amounting to £5,125, which has been borne on the vote of the Dominions Office since April 1st, 1934. About £30,000 of this money was the proportion allocated each year for veterinary research. The financial position continued to impose restrictions on the development of research.

Nine tables at the end of the report indicate the expenditure under the following headings :– (I) Expenditure on Agricultural Research (including Local Investigation and Advisory Work) ; (II) Annual Grants to Research Institutes from the Development Fund ; (III) Grants from the Development Fund for Special Investigations ; (IV) Special Research Grants from the Development Fund ; (V) Grants from the Ministry's Vote for Miscellaneous Investigations ; (VI) Grants for Research Schemes initiated by the Empire Marketing Board ; (VII) Grants from the Development Fund to Advisory Centres ; (VIII) Research Scholarships and Studentships in Animal Health, and (IX) Grants made to Research and Advisory Officers in respect of Attendance at Overseas Conferences, or of Special Studies Abroad.

The investigations shown in Table III have been in progress for some years, while the grants in Table IV are normally short-term. Local Investigation and Advisory Work in veterinary science included advice on important disease problems. The Foot-and-Mouth Disease Committee's investigations were mainly concentrated at Pirbright : small animal work was carried on at the National Institute for Medical Research. Arrangements were made for field studies on the subject of wild animals and birds as possible agents in the transmission of foot and mouth disease in co-operation with the Bureau of Animal Population at Oxford University (Department of Zoology). The expenditure of the Committee during the financial year 1934 was £16,475.

No account of the investigations carried out under the various subsidies is given in this report ; for that the reader is referred to a volume published annually, *viz.*, " Reports on the Work of Agricultural Research Institutes, and on certain other agricultural investigations in the United Kingdom."—J. C. Wallace.

New Zealand. (1935). **Report of Veterinary Laboratory, Wallaceville.** [Hopkirk, C. S. M.]—*Rep. Dep. Agric. N.Z., 1934-1935.* pp. 25-31. 5 tables.

The Wallaceville Veterinary Laboratory examined 8,731 specimens, including milk samples, while the subsidiary laboratory at Hamilton dealt with 40,340 samples mainly in connexion with the Mammitis Control Scheme. 37,010 doses of blackleg vaccine were issued for the control of that disease and no cases of blackleg occurred in calves through failure in immunization.

Mastitis.—The Control Scheme, which is based on a monthly grouping of cows following assessment of leucocytes found in the cream of the first strippings, is said to be beneficial. " Chlorine " injected into the quarter has been used with some small success in treatment of acute mastitis.

Sterility.—Further information has been obtained on the morphological changes in the spermatozoa of the bull when correlated with the conception of cows at first service. These are believed to be the chief factor in temporary sterility in dairy cows in New Zealand. Rat feeding experiments carried out at the laboratory are reaching an interesting stage ; it is believed that certain protein break-down products are required for the formation of spermatozoa.

Grass Staggers of Dairy Cows.—Control of grass tetany was attempted by the use of dolomite in ensilage and some benefit has apparently been noticed on farms using it. Further investigation is proceeding along the lines of monthly analysis of pastures and analysis of organs of affected and control animals. The magnesium content of urine and blood from affected animals correspond.

Tympany of Dairy Cows.—No connexion could be found between the HCN content of pasture, rumen contents and tympany. It is believed that gases are adsorbed on to the food present in the rumen and that these gases are released on taking in new food of a certain nature. Tympanites would appear to be associated with a reduction in the normal acidity of the rumen contents.

Rickets in Sheep.—Rickets was noted in several districts and was found to be connected either with prolonged feeding of green oats or on pasture deficient in phosphates. Oat analyses showed a high phosphate and low calcium and protein content. [The statement regarding oat analysis is wrongly made in the report].

Photosensitization in Sheep.—Southdown lambs on several properties showed photosensitization. Breeding trials, using an affected ram kept for two years in shade at Wallaceville and Southdown ewes, are being carried out. It is thought that the condition is due to some hereditary defect.

Facial Eczema is a seasonal photosensitization which occurs in flush autumns after drought conditions. A large outbreak was investigated. *Post-mortem* examination showed a severe blockage of bile ducts resulting in atrophy and cirrhosis of the liver and hyperplasia of bile capillaries. Phylloerythrin was believed to be the causative agent.

Morton Mains and Mairoa Diseases of Sheep.—These two conditions can be classed as anaemia of weaned lambs and adult sheep respectively. In the first the trouble is believed to be due to intestinal parasites generally, while the second is most probably due to infestation with *Monodontus*.

Fowl Leucaemia.—Leucaemia of a lymphocytic type is becoming more prevalent in flocks. Attempts to transmit the disease from fowl to fowl and by feeding experiments failed.—C. S. M. Hopkirk.

India. (1935). **Annual Report of the Imperial Council of Agricultural Research for the Year 1933-34.** [Das, C.] pp. iii+141. 4 tables. New Delhi : Govt. of India Press. [8vo].

In spite of financial difficulties the Council has continued its endeavours to

stimulate research in various branches of animal husbandry. Since the issue of the last report, three standing committees have been appointed to deal with matters connected with animal nutrition, cattle breeding and dairying.

In regard to animal diseases, Investigation Officers have now been appointed in most of the provinces and some of the states, and the value of their work has already been recognized. They provide a link between the provincial field staff and the research institutions and colleges. Their reports are examined by expert committees of the Advisory Board with a view to the practical application of new methods of disease control throughout the country.

Special schemes for the investigation of parasitic infestation in ruminants and the study of tuberculosis and Johne's disease among domesticated animals have been evolved. A draft bill and model rules have been drawn up by the Advisory Board for dealing with the proper control of animal diseases in India and these are under the consideration of the Government of India.

The first annual report of the Physiological Chemist employed by the Government of Bengal to estimate the nutritional value of indigenous and imported fodders has been under review and certain suggestions were made for the future prosecution of the work.

Valuable work is stated to be in progress in regard to the selective breeding of goats and their improved management. Schemes for sheep-breeding research have been instituted at several centres. In order to develop animal husbandry on proper lines in India it is stated in the report that it is necessary to continue the systematic examination, collation and publication of statistical matter and to develop the regular collection of such data for all India. The official registration of the best breeds of pure-bred stock and the provision of a nucleus organization for the industrial development of livestock and the livestock industry are recommended. The need for a more effective cattle census taken simultaneously throughout India is stressed.

During the year the Advisory Board dealt with veterinary education and drafted a curriculum. The Board cordially approved of the four years' course of study already given at the Punjab Veterinary College and recommended a four years' course in each veterinary college when conditions permit.

In the meantime, a three years' course with intermediate science as the qualification for admission should be regarded as the minimum in all the colleges.

—G. K. Walker.

Government of India. (1934). **Annual Report of the Imperial Institute of Veterinary Research, Muktesar for the Year ending 31st March, 1934.** [Taylor, W.] pp. 53. 6 appendixes. New Delhi : Govt. of India Press. [8vo] [Re.1-12] [3s.]

During the year the research side of the institute was reorganized and three sections, *viz.*, Pathology, Serology and Protozoology were created. The post of whole-time protozoologist has not yet been filled ; it is hoped, however, that this will materialize in the near future.

The administrative section of the report, written by the Officiating Director, deals with Supplies and Services, Instruction, Production, General Research, Publications and Finance. It is interesting and informative, showing as it does the large-scale and extensive scope of the work of the institute.

Report of the Serology Section. [Haddow, J. R.]

This report deals at some length with experimental work connected with the duration of immunity to rinderpest following goat-virus inoculation. It is reported

that virus prepared from goat spleen tissue has proved to be more satisfactory than that obtained from blood. Much other work was done.

Experiments were conducted in regard to the possibility of using as a vaccine formolized tissues from animals that had died from anthrax. As a result of previous work at the institute, the issue of blackleg " natural " aggressin was replaced by a formolized culture vaccine ; this resulted in a great economy. In a suspected outbreak of haemorrhagic septicaemia in sheep, an antiserum of bovine strain appeared to be beneficial.

The examination of two large goat herds for contagious abortion revealed a fairly wide-spread infection, the organism concerned being more closely related serologically to *Br. abortus* than to *Br. melitensis*. Experimental work in connexion with bovine lymphangitis is being continued. *Pasteurella tuberculosis rodentium* was isolated from a case of bovine lymphangitis.

Work on amaurosis in calves indicated that the disease occurs frequently where nutritional defects exist.

Ephemeral fever (three-day sickness) in cattle was found to be readily transmissible by subcutaneous or intravenous inoculations of blood or cerebrospinal fluid taken at the height of the temperature reaction. Animals kept in close contact with the disease failed to become infected.

Vaccination against equine contagious abortion was carried out in one stud with apparently good results and the work is being extended to other studs.

The control of strangles in horse depots and studs was further studied. It was found that sporadic cases did not usually yield streptococci on culture but that staphylococci were more often implicated.

A considerable amount of routine work was carried out in both the bacteriological and biochemical laboratories in the testing and standardization of the products issued from the laboratory and in the examination of specimens received for diagnosis or report.

Certain other disease conditions were also investigated.

Report of the Pathology Section. [Datta, S. C. A.]

In this section a modified technique of vaccination against Johne's disease was elaborated on a small scale. Experiments to test the viability of the causal organism were made. Work connected with the classification of certain strains of *Mycobact. tuberculosis* was carried out. In addition to cattle, a positive diagnosis was made of the disease in three camels, a horse and an elephant. Uncertain results were obtained in testing the applicability of the urochromogen reaction.

A suspicion that the refractory skin sores frequently found on the humps of cattle in India might be associated with the presence of larvae of nematodes was considered in connexion with a publication on so-called " cascado " or stephanofilariasis in the Dutch East Indies [see Bubberman & Kraneveld – this *Bull.* **4.** 663]. Microfilariae were discovered in some diseased tissue received from Calcutta, but the identity of the parasite concerned remains to be determined.

A considerable amount of miscellaneous investigation was undertaken in respect of equine paraplegia, lichen tropicus in equines, equine schistosomiasis and other diseases. Helminthology is not being neglected and collections of worms from various sources are being made.

Report of the Protozoology Section.

In this section experimental treatment was continued on equine and bovine trypanosomiasis. Full reports on this work are promised. Bovine piroplasmosis and theileriasis received attention. A number of therapeutic agents were tried in the latter disease but the results were disappointing.

ENTOMOLOGY.

This section deals mainly with experiments on the transmission by arthropods of *Tryp. evansi* infection (surra) and of canine piroplasmosis.

ANNUAL REPORT OF THE DEPUTY DIRECTOR, IMPERIAL VETERINARY SERUM INSTITUTE, IZATNAGAR. [GOFFI, G. P.]

The report concludes with that of the Deputy Director of the Serum Institute at Izatnagar which is a branch establishment. The amount of serum produced is very large, 14,984 litres of anti-rinderpest serum, 7,362 litres of anti-haemorrhagic septicaemia serum, 1,230 litres of anti-blackleg serum and 578 litres of anti-anthrax serum being issued during the year.

The six appendixes give information concerning certain activities.—G. K. W.

INDIA, BOMBAY. (1934). **Annual Administration Reports of the Civil Veterinary Department, Bombay Presidency, including the Bombay Veterinary College; the Bombay City and Harbour Veterinary Department and the Civil Veterinary Department in Sind, for the Year 1933-34.** [FARBROTHER, E. S.] pp. 48. 22 tables. Bombay: Govt. Central Press. [8vo] [3 annas] [4d.]

The veterinary staff employed in the Bombay Presidency proper was, in addition to the Director of Veterinary Services, one Deputy Director, three Veterinary Inspectors and 119 Veterinary Assistant Surgeons. An Investigation Officer has been recently appointed. The staff employed at the veterinary college is not enumerated in the report.

The total mortality from contagious disease was less than in the previous year owing to rinderpest being less prevalent. The usual preventive measures were adopted. At the close of the year 106 hospitals and dispensaries were at work with an average daily attendance of 20·08. The number of students attending the veterinary college has slightly decreased. This institution continues to do good work and it is satisfactory that a recommendation to close it was not accepted by the government. Financial stringency continues to hamper the work of the department in many directions.

In Sind, the veterinary establishment consists of one Superintendent, two Veterinary Inspectors and 21 Veterinary Assistant Surgeons. A considerable decrease in the number of outbreaks of contagious disease is recorded. Eighty-four cases of surra were reported, of which 55 were treated successfully. There are 18 dispensaries at work in the Province.—G. K. WALKER.

INDIA, CENTRAL PROVINCES AND BERAR. (1933). **Annual Report on the Working of the Civil Veterinary Department of the Central Provinces and Berar for the Year ending 31st March, 1933.** [PILLAI, R. V.] pp. 31. 12 tables, 1 chart. Nagpur: Govt. Printing, C.P. [8vo] [Re.1-4].

STAFF.

The technical staff comprises the Director, the Deputy Director, three Deputy Superintendents (one in charge of the laboratory), one Veterinary Investigation Officer, 14 Veterinary Inspectors and 125 Veterinary Assistant Surgeons.

Despite reductions in the staff as a result of retrenchment and the increase of work in connexion with contagious disease, there was a considerable increase in the number of cases treated and castrations performed. The number of specimens examined and dealt with in the laboratory also increased.

GENERAL.

The year under report was one of the unhealthiest during the last decade.

RINDERPEST.—This disease was especially severe, the mortality reaching 31,807. There was a large increase in the number of inoculations performed. The method of goat-adapted virus vaccination was extended with satisfactory results, the aim being to produce immune belts, surrounding outbreaks.

PIROPLASMOSIS IN CATTLE.—Details are given of the use of trypan blue. It is suggested in the government review of the report that, when the new Central Provinces Cattle Diseases Act comes into force, the department will have power to stamp out and control more effectively the various cattle diseases.—G. K. W.

INDIA, HYDERABAD-DECCAN. (1935). **Annual Report of the Stud and Veterinary Department of H.E.H. the Nizam's Government for the Year 1933-1934.** [BADAMI, B. K.]. pp. 42. 3 figs. on 1 plate, 17 tables, 3 graphs. Hyderabad-Deccan : Govt. Central Press. [fcp].

The staff of the department consisted of one Director, four Deputy Superintendents and 119 Assistants. In addition a Veterinary Investigation Officer was employed for special research work. Contagious disease was normally prevalent throughout the year and it is stated that through the co-operation of the police authorities the reporting of outbreaks was more satisfactory. Protective inoculation was largely adopted, the use of goat virus against rinderpest being continued and extended with considerable success.

The Veterinary Investigation Officer [MAHAJAN, M. R.] was occupied in rinderpest vaccination work and in the investigation of diseases of domestic animals and fowls. He published an article on bovine trypanosomiasis [see this *Bull.* **5.** 204].

Work was continued in connexion with deficiency diseases of cattle.

An interesting list of parasites collected and preserved is included in the report.

There was a satisfactory attendance at the hospitals and dispensaries and a large number of animals were treated and castrated by the touring staff. Thirty-two horse and pony stallions were at work during the year and 13 breeding bulls.

Experiments with imported Bikanir sheep are in progress.—G. K. WALKER.

PALESTINE. (1933). **Report of the Veterinary Service for the Years 1931 and 1932.** [SMITH, J. M.]—*Rep. Dep. Agric. Palestine, 1931-1932.* pp. 99-163. 30 tables.

The Chief Veterinary Officer is now in charge of Animal Husbandry.

ANTHRAX.—132 outbreaks were reported during the two years under review. In two settlements vaccination was carried out annually by veterinary officers, and no deaths occurred. It is hoped that funds will be available to facilitate the preparation of vaccine on a large scale.

TUBERCULOSIS.—The incidence of this disease is low. 233 cases were observed in abattoirs during these two years.

BOVINE CONTAGIOUS ABORTION.—Good progress is being made with the eradication of this disease. Owners are being encouraged to adopt the government plan of control, details of which are set out in Annexure A.

GLANDERS AND EPIZOOTIC LYMPHANGITIS.—Few cases were reported. Reactors to the mallein test are slaughtered and compensation is paid to the owners.

BLACKLEG.—Prophylactic vaccination gave good results.

ANAPLASMOSIS AND PIROPLASMOSIS.—Considerable mortality results from these

diseases, especially if the animals are on poor pasture when the rains have failed.

Dourine.—Strong measures are being taken to suppress this disease. Permanent control of all breeding operations of horses has been secured. The complement-fixation test is being used for diagnosis ; reacting stallions are castrated and reacting mares prevented from breeding.

Foot and Mouth Disease.—An epidemic broke out in June, 1931, and, in spite of quarantine restrictions and extensive artificial inoculation, the disease continued to spread until the winter, when it gradually subsided. The disease ran a similar course in 1932, when for several reasons general measures of control were not introduced.

Rabies.—In 1932 the disease was diagnosed in wide-spread foci and threatened to assume serious proportions. Active measures were taken by restricting the freedom of dogs and destroying stray dogs in infected areas.

Sheep and Goat Pox are of frequent occurrence but the disease is not of a serious type.

Parasitic Gastro-Enteritis.—This disease is wide-spread in sheep and goats and causes much loss. Few stock-owners can be persuaded to carry out the necessary treatment with copper sulphate.

Mange.—There is a marked decrease in incidence, especially among camels.

Sheep and Goat Scab.—This disease is wide-spread, but only becomes serious to animal health when vitality is lowered from other causes.

Diseases of Poultry.—Heavy losses occur. Fowl pox, fowl plague and fowl cholera caused serious mortality. *Salmonella pullorum* infection has not been observed, but spirochaetosis, coccidiosis and leucaemia have occurred.

The Government is urging owners to make use of the facilities for diagnosis, etc., afforded by the veterinary laboratory and to vaccinate their poultry with pigeon pox virus.

### Quarantine.

The department is carrying out important work in the supervision of the international quarantine stations. Anthrax in sheep and goats, and foot and mouth disease in cattle were detected in several consignments.

### Abattoirs and Meat Inspection.

Several local authorities employ veterinary surgeons. Other inspectors are trained by the Government Veterinary Officer.

Details of the numbers of carcasses dealt with are given. Parasitic diseases are the chief causes of condemnation.

### Army and Police.

The department is responsible for veterinary supervision of animals of the British troops in Palestine and of the Palestine Police Force.

### Animal Husbandry.

A memorandum on animal husbandry is submitted and a livestock census is included.

In 1932 there were in Palestine 14,000 horses, 5,600 mules, 74,000 donkeys, 32,300 camels, 160,000 cattle, 7,400 buffaloes, 247,700 sheep, 380,600 goats and a little over one million head of poultry.—F. H. Manley.

Palestine. (1933). **Report of the Veterinary Laboratory, for the Years 1931 and 1932.** [Gilbert, S. J.]—*Rep. Dep. Agric. Palestine, 1931-1932.* pp. 126-130.

The results of the work are dealt with and the data are arranged in tabular form, the chief points of interest being described.

Over 30,000 agglutination tests for bovine contagious abortion and nearly 1,500 routine microscopic examinations were carried out. Blood tests on sheep and goats indicated the presence of undulant fever (*Br. melitensis* infection). Fifty-two samples of milk were examined. Anti-anthrax serum and vaccines against fowl typhoid, fowl pox and blackleg were prepared.

Blackleg.—Cultures on cystein agar proved promising for purposes of diagnosis and purification.

Dourine.—Considerable work was necessary to render the complement-fixation test reliable. Serum of local guinea pigs obtained from Egypt was found to be deficient in complement. Hot weather conditions increased the difficulties, but doubtful reactions do not now amount to more than 1·9 per cent.

Cell Inclusion Disease.—The work performed by Gilbert and Simmins is dealt with [see also this *Bull.* **2.** 445].

Fowl Typhoid.—Divergent types of *Salmonella gallinarum* were studied: there were indications that a polyvalent antigen was necessary for agglutination tests.

Brucella Infection of Fowls.—This disease was diagnosed by agglutination tests and a pure culture obtained with some difficulty from a slaughtered bird.

—F. H. Manley.

Fiji. (1935). **Department of Agriculture. Annual Report of the Veterinary Division for the Year 1934.** [Stuchbery, H. M.]—*Annu. Bull. Dep. Agric. Fiji. 1934.* pp. 17-25. 3 tables, 3 appendixes.

The report deals with administration, diseases of animals and animal husbandry.

Legislation was introduced to permit the importation of cattle from the United States of America. Progress continues to be made in the improvement in the quality of stock over the greater part of the islands.

Tuberculosis in cattle and swine constitutes the most serious disease problem in Fiji. Control of the disease was attempted by inspection of all bovines and the destruction of all clinical cases; also by the double intradermal tuberculin test in certain dairy herds. Reactors amongst the Suva dairy herds dropped from 3·34 per cent. in 1933 to 1·69 per cent. in 1934.

*Brucella abortus* infection is accounting for considerable economic loss among certain dairy herds. Vaccination with a live vaccine has been adopted on one property with a view to reducing this loss. Results so far have been satisfactory but it is too early yet to judge the success or otherwise of the experiment.

Other disease conditions more commonly noticed through the year were contagious ophthalmia of cattle, mastitis of cows, various parasitic conditions amongst all classes of stock, distemper amongst cats and fowl pox in poultry, especially young chickens.

Bullocks and horses do the greater share of the draught work in the colony. Cattle are also kept for beef purposes and dairying. The dairying industry had a fairly prosperous year, the imposition of an import duty on edible ghee substitutes having led to a decrease in the imports of these products, with an increased local market for butter and ghee at enhanced prices.

Pig-raising is becoming more popular, particularly among dairy farmers. Local consumption, although steadily increasing, is now practically supplied by locally bred pigs, whereas a few years ago the importation of pigs for this purpose was considerable.—H. M. Stuchbery.

County Borough of Belfast (Northern Ireland). (1935). **Report of the City Veterinarian for the Year 1934.** [McLean, A.] pp. 7. 11 tables. Belfast : S. C. Allen & Company, Ltd. [fcp].

Tables show the total number of animals of each species slaughtered and the number of carcasses, or portions of carcass, seized. Almost 170,000 animals passed through the municipal abattoir and the percentage of animals condemned from all causes was 0·4.

A comparison between tuberculosis and other diseases, as causes of condemnation of carcasses, is given in tabular form, 48 per cent. of the total seizures being due to tuberculosis. The age incidence of tuberculosis is given in tabular form. The condition of the animals seized for tuberculosis and the various organs condemned is similarly presented.

Reference is made to the examination of meat prepared outside the city boundary, to the inspection of food in shops, etc., and the city veterinarian is very appreciative of the collaboration between the various officials. The inspection of the dairies and cow-sheds is also under his supervision and appears to be on a very satisfactory footing.

In connexion with the electrical stunning of the smaller animals (sheep, goats, pigs and calves) it is stated " I have no hesitation in saying this is the simplest, cheapest, most suitable and least objectionable method of stunning animals known."

—H. G. Lamont.

—. (1934). **Annual Report of the Director, 1932-33, Agricultural Experiment Station, University of Wisconsin, Madison. [Veterinary Science].**—*Bull. Univ. Wis. Sci. Ser.* No. 428. pp. 1-8.

Mastitis is first described and an experiment is recorded in which a herd of dairy cattle was formed of 26 " ceased reactor " cows and 14 unbred negative reacting heifers. During two years no case of *Brucella abortus* infection occurred, indicating that the " ceased reactor " cows were not a danger.

Fowl coccidiosis is described and the fact that oocysts resist the ordinary incubation is emphasized.

Wisconsin has a very large fur animal industry and there was investigation of the extent to which disease causes loss. The following parasites were noted in 145 fox carcasses :– *Uncinaria stenocephala* (73 per cent.) ; *Otodectes cynotes* (68 per cent.) ; *Capillaria plica* (58 per cent.) ; *Eucoleus aerophilus* (43 per cent.) ; *Toxocara canis* (28 per cent.), and *Taenia pisiformis* (3 per cent.)—J. E.

Algeria. (1935). Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1934. **[Report of the Pasteur Institute for 1934].** [Sergent, Ed.]—*Arch. Inst. Pasteur Algér.* **13.** 418-450. 2 tables. [Numerous refs.]

Recent research indicates that species of *Phlebotomus* transmit the leishmania of oriental sore, and that they are probably the vectors of visceral leishmaniasis. In Algeria, it appears that the leishmania of the lizard can be transmitted by ingestion.

Vaccination against piroplasmosis was effective and its use is increasing, 2,657 bovines having been vaccinated during 1932 to 1933. In preparing the vaccine, care was taken to separate the types of piroplasm one from the other. All piroplasms of domestic animals can be transmitted *via* the placenta.

Intravenous inoculation of " ichthargan " was effective against *Aegyptianella pullorum* infection.

An organism of the bartonella type was demonstrated during routine examinations of bovine blood for piroplasms. No clinical symptoms were produced.

The milk yield of cows was considerably increased by adding calcium phosphate and sodium chloride to their rations.

An outline is given of the entomological work in progress, and tables indicate the details of specimens examined, and the various vaccines and sera produced. —F. H. MANLEY.

TUNIS. (1935). Rapport sur le service vétérinaire pendant l'année 1934. **[Report of the Veterinary Service for 1934].** [COTTIER, H.]—*Bull. Off. internat. Epiz.* **11.** 92-96. [1 ref.]

The eradication of rinderpest, contagious bovine pleuro-pneumonia, glanders and swine erysipelas was considered to be complete. Although there had been an increase of foot and mouth disease and dourine in 1933, no cases were observed during 1934.

TUBERCULOSIS.—Forty-four cases were seen: most of them occurred in slaughtered French dairy cows, despite tuberculin testing before importation.

ANTHRAX.—An exceptionally severe outbreak occurred in the district of Gafsa, and 2,000 free vaccinations were carried out.

*Brucella abortus* INFECTION AND JOHNE'S DISEASE.—Outbreaks were common. Immunization against the latter disease, and means for its early diagnosis, were studied.

BLACKLEG.—Fewer outbreaks were observed than in previous years.

RABIES occurred frequently, its control being rendered difficult by the existence of numerous stray dogs.

SHEEP SCAB.—90,000 sheep were dipped as a preventive measure.

CUTANEOUS HABRONEMIASIS (" SUMMER SORE ").—This attacks most donkeys imported from the Pyrenees and from Poitou. " Novarsenobenzol ", injected intravenously, proved efficacious although expensive.

POULTRY DISEASES.—Outbreaks of fowl diphtheria, typhoid, cholera and spirochaetosis were observed, and also a contagious pneumonia of chicks.—E. W. A.

FRENCH WEST AFRICA. (1935). Rapport sur le fonctionnement des services de l'élevage pendant l'année 1934. [CURASSON, G.] **[Report of the Live-stock Services of French West Africa for 1934].** pp. 30. 7 tables. [fcp]. [Mimeographed].

INFECTIOUS DISEASES.

ANTHRAX.—Outbreaks occurred in Senegal, the Ivory Coast and Guinea, and in the latter colony 16,000 preventive vaccinations were carried out.

BOVINE TUBERCULOSIS was encountered in slaughter cattle in Niger and Senegal, and in imported cattle in the Ivory Coast. In Sudan the tuberculin test, in one area, revealed an infection rate of 5·48 per cent., and 22 generalized cases were encountered in one abattoir. New legislation has been enacted prescribing the slaughter of all tuberculin reactors. Tuberculosis of pigs was encountered in Dahomey, and of fowls in the Ivory Coast.

VARIOUS.—Haemorrhagic septicaemia was observed in Nigeria, Sudan and Dahomey. Caseous lymphadenitis is wide-spread and infectious necrotic hepatitis of sheep [? black disease] reappeared in Sudan, attacking not only imported sheep and half-breds, but also native animals. Sporadic cases of epizootic lymphangitis (*Cryptococcus farciminosus* infection) have occurred in horse-raising areas, and important losses occurred in Niger. Treatment with biniodide of mercury is said to have given the best results.

TRYPANOSOMIASIS.—The stock-owners are said to be so accustomed to trypanosomiasis that the disease does not often come under observation except for occasional serious epizootics. *Tryp. congolense*, *T. brucei* and *T. soudanense* are encountered in horses, *T. vivax*, *T. congolense*, *T. brucei*, *T. pecaudi* and *T. theileri* in cattle, and *T. brucei* in dogs. An outbreak of trypanosomiasis in imported cattle was successfully treated with tartar emetic.

PIROPLASMOSIS has not been encountered in horses, but occurs in cattle mainly as a relapse condition in connexion with such diseases as rinderpest.

AEGYPTIANELLA infection of fowls is common in the Sudan and can be successfully treated with " gonacrine ".

RINDERPEST.—Outbreaks have occurred in all the colonies during the year, the disease being most prevalent in Guinea, the Ivory Coast, Dahomey and Sudan. In Guinea, outbreaks were dealt with by the use of serum ; in the Sudan and Dahomey, combinations of the serum-simultaneous method and vaccination were employed, whilst in the other territories reliance appears to have been placed on vaccination. The number of centres for the preparation of vaccine has been increased and the system of vaccine preparation at the scene of outbreaks has been extended.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA has also occurred in all the colonies, the largest number of outbreaks occurring in Niger, the Ivory Coast and Sudan. The disease has been controlled by the use of formolized tissue vaccines and, in the Ivory Coast, treatment with " novarsenobenzol " has given excellent results.

FOOT AND MOUTH DISEASE has been absent from the colonies except for a few outbreaks in Niger.

VARIOUS.—Rabies occurred in Senegal, the Ivory Coast, Niger and Sudan, blue tongue in Sudan, heartwater in the Ivory Coast, sheep pox and contagious pleuro-pneumonia of goats in Niger.

### PARASITIC DISEASES.

Sheep scab has only been encountered on one stock farm and equine mange is also very rare. Follicular mange in cattle has been detected in Sudan. The most important losses due to helminths have been outbreaks of ovine parasitic gastritis in the Ivory Coast and verminous bronchitis of cattle and goats in Niger.

### GENERAL.

Information is also given on the development of the animal industry, and on the livestock establishments and laboratories attached to each colony. It is noted that attempts to produce a goat-virus vaccine against rinderpest have failed, as no attenuation of the virus could be obtained by passage through goats. The stock census shows a decrease in the number of cattle in the territories, but this is explained by the fact that the returns are more accurate by the movement of stock to neighbouring territories, and by increased sales, and is not attributed to disease.—U. F. RICHARDSON.

## BOOK REVIEWS.

SEIDEL, K. [Dr. med. vet. Tierärztlicher Berater der Reichsfachgruppe Kaninchenzüchter e. V. in Reichsverband Deutscher Kleintierzüchter e. V.] (1935). Die Krankheiten des Kaninchens. [**Diseases of Rabbits**]. pp. 106. 49 figs. Berlin : Richard Schoetz. [8vo] [RM.2·80].

The book is divided into three parts :– (1) the anatomy and physiology of the rabbit ; (2) the reasons for disease : this section includes instructions upon the

correct manner of examining rabbits as well as information on their housing and feeding, and (3) a description of the specific diseases. In the first two sections, which together cover only 38 pages, the subjects are merely outlined. Special diseases are described under the headings bacterial, fungous, protozoal, internal and external parasitic, and non-infectious diseases. Symptoms, lesions, diagnosis, treatment and control of diseases are discussed wherever the information is available.

For rabbit breeders having little or no previous knowledge of anatomy, physiology, hygiene, dietetics and disease, this book should be a very useful guide. The advice on how to keep rabbits healthy is sound. It should also be of assistance for the tentative diagnosis and treatment of the fairly obvious diseases such as tapeworm infestation, cysticercosis, favus, etc. To the veterinarian, the chief value of the book is as a catalogue of diseases from which rabbits are known to suffer.—E. J. PULLINGER.

McCLENDON, J. F. [Professor of Physiological Chemistry, University of Minnesota Medical School]. (1934). **A Manual of Biochemistry.** pp. vii+381. 58 figs., 21 tables. [Numerous refs.] New York : John Wiley & Sons, Inc. London : Chapman & Hall, Ltd. [8vo] [25s.]

This book is not a class-book in the ordinary sense, but a collection of essential data on the biochemistry of inorganic and certain organic substances, more comprehensive than usually found in text-books of physiological chemistry – to which it therefore forms a valuable supplement. Wherever possible, substances are arranged in their chemical order with their physiological order in a summary. Many of the data are condensed into a comprehensive table at the end, which lists over a thousand substances of interest from a biological point of view. The volume is very convenient for rapid reference purposes.—H. H. GREEN.

ARMSTRONG, E. F. [D.Sc., Ph.D., Ll.D., F.R.S.], & ARMSTRONG, K. F. [M.A., B.Sc.]. (1934). **The Carbohydrates.** pp. vii+252. 22 tables. [Numerous refs.] London, New York & Toronto : Longmans, Green & Co. [5th Edit.] [8vo] [15s.]

The present work completes the revision, in two parts, of the earlier single volume monograph " The Simple Carbohydrates and Glucosides " first published in 1910 and reaching its fourth edition in 1924. The revision of one section appeared in 1931 under the title " The Glycosides ". The present volume brings the section on carbohydrates up to date and is written primarily for those interested in sugar chemistry from the biochemical aspect.

Attention is focussed on the natural carbohydrates, and the main essentials of the different structural combinations shown in nature are discussed. The last two chapters deal with the relation between chemical configuration and biological behaviour, and with the synthesis of carbohydrates in the plant.

The monograph is sufficiently well known in its earlier form to render superfluous any comments on its general excellence and it need only be pointed out that, during the ten years elapsing since the previous edition, a vast amount of more exact knowledge has been acquired on the structure of the dissacharides, the oligosaccharides and some of the polysaccharides of higher molecular weight although, as the authors point out, much still remains to be done on the polysaccharides which have recently come into prominence in immunology.—H. H. G.

FISCHL, V. [Auswärtiger wiss. Mitarbeiter der Schering-Kahlbaum A.-G., Berlin]., & SCHLOSSBERGER, H. [Prof. Mitglied des Reichsgesundheitsamtes, Berlin-

Dahlem]. (1934). Handbuch der Chemotherapie. Zweiter Teil. Metallderivate. **[Treatise on Chemotherapy. Part II. Metallic Derivatives]**, pp. xi+540. 63 tables. [Numerous refs.] Leipzig : Fischers Medizinische Buchhandlung. [8vo] [RM.89].

This volume represents the second part, pp. 359-898, of the comprehensive reference work of which the first part has already been reviewed [see this *Bull.* **3**. 392]. The first volume dealt with non-metallic organic compounds. The present one deals with derivatives of the metals and metalloids, organic and inorganic, and with certain other elements such as iodine and fluorine. A third volume of a more general character is promised at an early date if sufficient demand is shown but may otherwise be postponed until a new edition of the whole treatise is required.

The subject matter is arranged in ten special sections, numbered 13 to 22 in sequence with section 12 of part I, with an appropriate special bibliography at the end of each chapter and with a comprehensive concluding subject index (pp. 876-898). Section 13 on arsenicals is naturally the largest, occupies 179 pages and is appropriately sub-divided according to the chemical constitution of the various groups of compounds discussed. Section 14 deals with compounds of antimony and section 15 with those of bismuth. Section 16 devotes 19 pages to iodine and its derivatives, organic and inorganic. Sections 17, 18, 19 and 20 deal respectively with copper, silver, gold and mercury. Section 21 considers 11 specifically active, rare metals (vanadium, tantalum, gallium, indium, tellurium, ruthenium, rhodium, palladium, osmium, iridium, platinum) and section 22 briefly considers the remaining elements.

The presentation of material is lucid, the short sentence style makes the German easy to read, and the authors can be congratulated on bringing together a mass of data not hitherto assembled in a single treatise. Like part I, the volume is essential to the shelves of relevant libraries.—H. H. GREEN.

FISHER, R. A. [Sc.D., F.R.S., Galton Professor, University of London]. (1935). **The Design of Experiments.** pp. xi+252. 5 figs., 39 tables. [Numerous refs.] Edinburgh and London : Oliver & Boyd. [8vo] [12s. 6d.]

It is not too much to say that it would well repay most research workers to study carefully the principles and conclusions discussed by Professor Fisher in this exceptionally well-written book. Most of us are familiar with such critical statements as " his controls are totally inadequate " which, as the author says, if uttered by one of scientific eminence, is difficult to refute, and may often be the means of temporarily embarrassing the most promising of research workers. The aim of the present book is to give readers an insight into the value of statistical methods in planning experiments, and it is shown that very often even a slight alteration in the design will increase the significance of the results and place the experimenter in a very safe position as regards such criticism.

From the point of view of those engaged in research relating to animal disease, it is to be regretted that the author takes his examples almost entirely from field trials in connexion with agricultural research since, despite his belief that the same methods can be applied to other fields of research, straightforward application does not appear either possible or, in some cases, desirable. Apart from this, however, readers will be stimulated to pay increased attention to the structure of their experiments and to the interpretation of their results since, to quote the author, " if the design of an experiment is faulty, any method of interpreting which makes it out to be decisive must be faulty too ". Finally, the book is so written that lack of statistical knowledge need not deter anyone from reading and understanding the methods of the author.—JAMES STEWART.